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[Title of the Invention] Server Apparatus for remotely Managing
Client, Server Apparatus Control Program
and Medium Storing Thereof, and Server
Apparatus Control Procedure
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[Title of the Invention] Server Apparatus for remotely Managing
Client, Server Apparatus Control Program

and Medium Storing Thereof, and Server
Apparatus Control Procedure

[Scope of Claims]

[Claim 1]

- 5 A server apparatus connected with one or a plurality of clients,
characterized by having steps of:
transferring to the client data in which a newly generated server
side request and a response to a client side request are described;
and
10 obtaining, from the client, data in which the response to the
server side request and a response to the newly generated client
side request at the client are described.

[Claim 2]

- The server apparatus according to claim 1, wherein the server
15 apparatus executes the client side request and transfers a
response to the client side request being output as a result of
the execution.

[Claim 3]

- A server apparatus connected with one or a plurality of clients,
20 comprising:
a storing means including a first memory area for storing a
server side request being a request to the client, and a second
memory area for storing a client side request being a request from
the client and a response from the server apparatus to the request;
25 a request generation means for generating the server side
request and storing the request in the first memory area of the
storing means;
a request acquiring means for acquiring a request including the
client side request from the client being connected with the
30 server apparatus through a communication network;
a request distribution means for storing the client side request
included in the acquired request to the second memory area of the
storing means;

a response generation means for reading the client side request from the second storing area of the storing means, generating a response to the request, and storing the generated response in the second storing area;

5 a response collection means for reading the response generated by the response generation means from the second storing area and reads the server side request generated by the request generation means from the first storing means; and

a response output means for transmitting the response being read
10 and a response including a server side request to the client being connected.

[Claim 4]

A server apparatus connected with one or a plurality of clients, comprising:

15 a storing means including a first memory area for storing a server side request corresponding to a request to the client in association with the request identification information to the request, and a second memory area for storing a client side request corresponding to a request from the client, a response to the
20 request from the server apparatus, and the request identification information of the request in association with each other;

a request generation means for generating the server side request, assigning the request identification information for identifying the request, and storing the request in the first
25 storing area of the storing means;

a request acquisition means for acquiring a request including association of the client side request with request identification information and association of a response to the server side request with the request identification information
30 of the server side request from a client having come to connect to the server apparatus through a communication network;

a request distribution means for storing the association of the client side request included in the acquired request with the

request identification information in the second storing area of the storing means, checking the request identification information associated with the response included in the request with the request identification information assigned to each
5 server side request in the first storing area, and specifying a server side request of the first storing area corresponding to the response;

a response generation means for reading a client side request from the second storing area of the storing means, generating a
10 response to the request, associating the response with the request identification information of the client side request, and storing the response in the second storing area;

a response collection means for reading association of the response generated by the response generation means with the
15 request identification information of the client side request corresponding to the response, and reading the association of the server side request generated by the request generation means with the request identification information of the request from the first storing area; and

20 a response output means for transferring a response including the association of the read response with the request identification information and the association of a server side request with the request identification information to the client coming to be connected.

25 [Claim 5]

The server apparatus according to claim 4, comprising a response status management means for judging whether or not a response to the client side request received from the client having come to be connected may be generated during the connection,
30 generating a response delay notice to the client side request when the response may not be generated, associating the generated response delay notice with the request identification information of the client side request, and storing the association in the

second storing area of the storing means, wherein the response collection means reads the association of the response delay notice with the request identification information from the second storing area, and the response output means includes in
5 the response and transfers the association of the read response delay notice with the request identification information.

[Claim 6]

The server apparatus according to claim 4, wherein:
the request acquisition means acquires a request including the
10 association of the client side request, the request identification information of the request and the sender identification information of a client corresponding to the sender of the request;

the request distribution means stores the association of the
15 client side request, the request identification information, and the sender identification information included in the acquired request, in the second storing area;

the response collection means reads the association of a response generated by the response generation means, the request
20 identification information of a client side request corresponding to the response, and the sender identification information of the request, from the second storing area; and

the response output means includes in the response and transfers the association of the read response, the request identification
25 information and the sender identification information.

[Claim 7]

The server apparatus according to claim 6, wherein:
the request acquisition means acquires the request including association of the response, the sender identification
30 information and the request identification information, serialized in accordance with a code being defined by a predetermined address;

the request distribution means restores, in accordance with a

code defined by the predetermined address, association of the client side request, the request identification information and the sender identification information, included in the acquired request;

5 the response collection means serializes, in accordance with a code defined by a predetermined address, the read association of the response, the request identification information and the sender identification information; and

the response output means includes in the response and transfers
10 the serialized association of the response, the request identification information and the sender identification information.

[Claim 8]

The server apparatus according to claim 7, wherein the
15 response collection means serializes the read request identification information and the sender identification information as a SOAP header and serializes the read response as a SOAP body.

[Claim 9]

20 The server apparatus according to claims 6 to 8, wherein:
the request generation means generates the destination identification information of the client corresponding to a destination of the generated server side request and stores the generated destination identification information in the first
25 storing area in association with the server side request;

the response collection means reads the association of the sever side request, the request identification information and the destination identification information from the first storing area; and

30 the response output means includes in the response and transfers the association of the read server side request, the request identification information and the destination identification information.

[Claim 10]

The server apparatus according to claim 9, wherein:

the response collection means serializes the read association
of a server side request, the request identification information
5 and the destination identification information, in accordance
with a code defined by a predetermined address; and

the response output means includes in the response and transfers
the serialized association of a server side request, the request
identification information and the destination identification
10 information.

[Claim 11]

The server apparatus according to claim 10, wherein the
response collection means serializes the read request
identification information and destination identification
15 information as a SOAP header and serializes the read server side
request as a SOAP body.

[Claim 12]

The server apparatus according to claims 6 to 8, wherein:

the request acquiring means acquires the request including a
20 response to the server side request from the client, the request
identification information of the request and the destination
identification information of a client corresponding to the
destination of the request, from a client having come to connect
to the server apparatus through a communication network; and

25 the request distribution means checks the request
identification information and the destination identification
information in association of the response included in the request,
with the request identification information and the
identification information in association of each server side
30 request in the first storing area, and specifies a server side
request in the first storing area corresponding to the response.

[Claim 13]

The server apparatus according to claim 12, wherein:

the request acquisition means acquires the request including association of the response, the request identification information and the destination identification information, serialized in accordance with a code defined by a predetermined
5 address; and

the request distribution means restores the response, the request identification information and the destination identification information, included in the request, in accordance with the code defined by the predetermined address.

10 [Claim 14]

The server apparatus according to claim 11, comprising an attachment processing means for setting a link between the serialized association of a response to a client side request, the request identification information and the sender
15 identification information and the serialized association of a server side request, the request identification information and the destination identification information and associating each other.

[Claim 15]

20 A control program for causing a control means of a server apparatus being connected with one or a plurality of clients to execute:

a process for transferring data being described with a newly generated server side request and a response to a client side
25 request; and

a process for obtaining data being described with a response to the server side request and a response to a newly generated client side request at the client.

[Claim 16]

30 The control program according to claim 15, wherein the client side request is executed and a response to a client side request newly generated at the client is transferred.

[Claim 17]

A control program for causing a control means connected with one or a plurality of clients to execute processing of:

securing a first storing area for storing a server side request corresponding to a request to the client and a second storing area
5 for storing a response to the request from the server apparatus,
in a storing means of the server apparatus;

generating and storing the server side request in the first storing area of the storing means;

obtaining a request including the client side request from a
10 client having come to connected to the server apparatus through
a communication network;

storing a client side request included in the obtained request in the second storing area of the storing means;

reading a client side request from the second storing area of
15 the storing means and generating a response to the request and
storing the generated response in the second storing area;

reading a response generated by the response generation means from the second storing area and reading the server side request generated by the request generation means from the first storing
20 area; and

transferring a response including the read response and a server side request to the client having come to connect.

[Claim 18]

A control program for causing a control means of a server
25 apparatus being connected with one or a plurality of clients to
execute processing of:

securing, in a storing means provided in the server apparatus, the first storing area where a server side request corresponding to a request to the client and the request identification
30 information of the request are stored in association with each other, and the second storing area where a client side request corresponding to a request from the client, a response from the server apparatus to the request and the request identification

information of the request are stored in association of each other;

generating the server side request, assigning the request identification information for identifying the request and
5 storing the request in the storing area of the storing means;

acquiring a request including association of the client side request with the request identification information and association of a response to the server side request with the request identification information of the server side request
10 from a client having come to be connected to the server apparatus through a communication network;

storing the association of a client request and the request identification information included in the acquired request in the second storing area of the storing means, checking the request
15 identification information in association with the response included in the request with the request identification information assigned to each server side request at the first storing area, and specifying a server side request in the first storing area corresponding to the response;

20 reading a client side request from the second storing area of the storing means, generating a response to the request, and storing the response in the second storing area in association with the request identification information of the client side request;

25 reading association of a response generated by the response generation means with the request identification information of a client side request corresponding to the response from the second storing area and reading association of a server side request generated by the request generation means with the request
30 identification information of the request from the first storing area; and

transferring a response which includes the read association of the response and the request identification information and the

association of the server side request with the request identification information, to the client having come to connect.

[Claim 19]

The control program according to claim 18, which causes the
5 control means to execute processing of:

judging whether a response to a client side request received from the client having come to be connected may be generated during the connection with the client, generating a response delay notice to the client side request when it is judged that the notice may
10 not be generated during the connection, and storing the generated response delay information in association with the request identification information of the client side request in the second storing area;

reading association of the response delay notice area; and
15 including in the response and transferring the read association of the response delay notice with request identification information.

[Claim 20]

The control program according to claim 20, which causes the
20 control means to execute processing of:

acquiring a request including association of the client side request, the request identification information of the request and the sender identification information of the client corresponding to the sender of the request, from the client having
25 come to connect with the server apparatus through a communication network;

storing the association included in the obtained request, of a client side request, the request identification information and the sender identification information, in the second storing area
30 of the storing means;

reading association of a response generated by the response generation means, the request identification information of the corresponding client side request and the sender identification

information of the request, from the second storing area; and including in the response and transferring the read association of the response, the request identification information and the sender identification information.

5 [Claim 21]

The control program according to claim 21, which causes the control means to execute processing of:

acquiring the request having been serialized in accordance with a code defined by a predetermined address and including
10 association of the response, the sender identification information and the request identification information;

restoring the association of the client side request, the request identification information and the sender identification information, which is included in the acquired request, in
15 accordance with a code defined by the predetermined address;

serializing the read association of a response, the request identification information and the sender identification information, in accordance with a code defined by a predetermined address; and

20 including in the response and transferring the serialized association of a response, the request identification information and the sender identification information.

[Claim 22]

The control program according to claim 21, which causes the
25 control means to execute processing of serializing the read request identification information and the sender request information as a SOAP header and serializing the read response as a SOAP body.

[Claim 23]

30 The control program according to claims 20 to 22, which causes the control means to execute processing of:

generating the destination identification information of the client corresponding to the destination of the generated server

side request, and storing the generated destination
identification information and the server side request in
association with each other in the first storing area; and
reading the association of the server side request, the request
5 identification information and the destination identification
information from the first storing area, and which causes the
response output means to execute a process for including in the
response and transferring the read association of the server side
request, the request identification information and the
10 destination identification information.

[Claim 24]

The control program according to claim 23, which causes the
control means to execute processing of:
serializing the read association of a server side request, the
15 request identification information and the destination
identification information in accordance with a code defined by
a predetermined address; and
including in the response and transferring the serialized
association of a server side request, the request identification
20 information and the destination identification information.

[Claim 25]

The control program according to claim 24, which causes the
control means to execute processing of serializing the read
request identification information and the destination
25 identification information as a SOAP header and serializing the
read server side request as a SOAP body.

[Claim 26]

The control program according to claims 20 to 22, which causes
the control means to execute processing of:
30 acquiring the request including association of a response from
the client to the server side request, the request identification
information of the request and the destination identification
information of a client corresponding to the destination of the

request, from a client having come to connect to the server apparatus through a communication network;

checking the request identification information and the destination identification information, associated with the response included in the request, with the request identification information and the destination identification information, associated with each server side request in the first storing area, and specifying a server side request in the first storing area, which corresponds to the response.

10 [Claim 27]

The control program according to claim 26, which causes the control means to execute processing of:

acquiring the request including association of the response, the request identification information and the destination identification information, which has been serialized in accordance with a code defined by a predetermined address; and

restoring the response, the request identification information and the destination identification information, having been included in the request, in accordance with a code defined by the predetermined address.

[Claim 28]

The control program according to claim 25, which causes the control means to execute processing of setting a link for associating the serialized association of a response to a client side request, the request identification information and the sender identification information with the serialized association of a server side request, the request identification information and the destination identification information.

[Claim 29]

30 A control method by a control means of a server apparatus being connected with one or a plurality of clients, including procedures of:

transferring, to the client, data describing a newly generated

server side request and a response to a client side request; and
acquiring, from the client, data describing a response to the
server side request and a response to a newly generated client
side request at the client.

5 [Claim 30]

The control method according to claim 29, including a
procedure for executing the client side request and transferring
a response to the client side request, which has been generated
as a result of the execution.

10 [Claim 31]

A control method by a control means of a server apparatus being
connected with one or a plurality of clients, including procedures
of:

securing a first storing area for storing a server side request
15 corresponding to a request to the client and a second storing area
for storing a client side request corresponding to a request from
the client and a response to the request from the server apparatus;
generating the server side request and storing the request in
the first storing area of the storing means;

20 acquiring a request including the client side request, from a
client having come to connect to the server apparatus through a
communication network;

storing the client side request included in the acquired request
in the second storing area of the storing means;

25 reading the client side request from the second storing area
of the storing means, generating a response to the request and
storing the generated response in the second storing area;

reading the response generated by the response generation means
from the second storing means and reading the server side request
30 generated by the request generation means from the first storing
area; and

transferring the read response and a response including a server
side request to the client having come to connect.

[Claim 32]

A control method by a control means of a server apparatus being connected with one or a plurality of clients, including procedures of:

5 securing, in a storing means included in the server apparatus, a first storing area for storing a server side request corresponding to a request to the client in association with the request identification information of the request and a second storing area for storing a client side request corresponding to
10 a request from the client, a response to the request from the server apparatus and the request identification information of the request in association with each other;

generating the server side request, assigning the request identification information for identifying the request, and
15 storing in the first storing area of the storing means;

acquiring a request including association of the client side request with the request identification information and association of a response to the server side request with the request identification information of the server side request,
20 from a client having come to connect to the server apparatus through a communication network;

storing the association included in the acquired request of a client side request and the request identification information in the second storing area of the storing means, checking the
25 request identification information associated with the response included in the request with the request identification information assigned to each server side request in the first storing area, and specifying a server side request corresponding to the response in the first storing area;

30 reading a client side request from the second storing area of the storing means, generating a response to the request, and storing the request in the second storing area in association with request identification information of the client side request;

reading, from the second storing area, the association of the response generated by the response generation means with request identification information of a client side request corresponding to the response, and reading, from the first storing area, the
5 association of a server side request generated by the request generation means with the request identification information to the request; and

transferring a response including association of the read response and the request identification information and
10 association of a server side request and the request identification information to the client having come to be connected.

[Claim 33]

The control method according to claim 32, wherein the control
15 means executes procedures of:

determining whether a response to a client side request received from the client having come to connect may be generated during the connection with the client, generating a response delay notice to the client side request when it is determined that the
20 generation is impossible, and storing the generated response delay notice in association with the request identification information of the client side request in the second storing area;

reading association of the response delay notification and the request identification information from the second storing area;
25 and

including in the response and transferring the read association of the response delay notice and the request identification information.

[Claim 34]

30 The control method according to claim 32, wherein the control means executes procedures of:

acquiring a request including association of the client side request, the request identification information of the request,

and the sender identification information of the client corresponding to the sender of the request, from the client having come to connect to the server apparatus through a communication network;

5 storing the association included in the acquired request, of a client side request, the request identification information, and the sender identification information, in the second storing area of the storing means;

10 reading the association of the response generated by the response generation means, the request identification information of the client side request corresponding to the response, and the sender identification information of the request, from the second storing area; and

15 including in the response and transferring the read association of the response, the request identification information, and the sender identification information.

[Claim 35]

The control method according to claim 34, wherein the control means executes procedures of:

20 acquiring the request including the association of the response, the sender identification information, and the request identification information, which has been serialized in accordance with a code defined by a predetermined address;

25 restoring, in accordance with a code defined by the predetermined address, the association of the client request, the request identification information, and the sender identification information, which is included in the acquired request;

30 serializing, in accordance with a code defined by a predetermined address, the read association of a response, the request identification information, and the sender identification information; and

transferring the serialized association of the response, the

request identification information, and the sender identification information.

[Claim 36]

5 The control method according to claim 35, including a procedure by the control means, whereby the read request identification information and the sender identification information are serialized as a SOAP header and the read response is serialized as a SOAP body.

[Claim 37]

10 The control method according to claims 34 to 36, wherein the control means executes procedure of:

generating the destination identification information of the client corresponding to the destination of the generated server side request and storing the generated destination identification information in the first storing area in association with the server side request; and

15 reading the association of the server side request, the request identification information, and the destination identification information, from the first storing area, and including a procedure by the response output means for including in the response and transferring the read association of the server side request, the request identification information, and the destination identification information.

[Claim 38]

25 The control method according to claim 37, which causes the control means to execute procedures of:

serializing the read association of a server side request, the request identification information, and the destination identification information in accordance with a code defined by a predetermined address; and

30 including in the response and transferring the serialized association of the server side request, the request identification information, and the destination identification

information.

[Claim 39]

The control method according to claim 38, including a procedure for serializing the read request identification
5 information and the destination identification information as a SOAP header and the read server side request as a SOAP body by the control means.

[Claim 40]

The control method according to claims 34 to 36, wherein the
10 control means carries out procedures of:

acquiring the request which includes a response to the server apparatus the request from the client, the request identification information of the request, and the destination identification information of a client corresponding to the destination of the
15 request, from a client which has come to be contacted to the server apparatus through a communication network; and

checking the request identification information and the destination identification information, which have been associated with the response included in the request, and the
20 request identification information and the destination identification information, which have been associated with each server side request in the first storing area, and specifying a server side request corresponding to the response in the first storing area.

25 [Claim 41]

The control method according to claim 40, wherein the control means performs procedures of:

acquiring the request including the association of the response, the request identification information, and the destination
30 identification information, which has been serialized in accordance with a code defined by a predetermined address; and restoring, in accordance with a code defined by the predetermined address, the response, the request identification

information, and the destination identification information, which have been included in the request.

[Claim 42]

5 The control method according to claim 39, including a procedure by the control means, wherein by setting a link between the serialized association of a response to a client side request, request identification information, and sender identification information, and the serialized association of a server side request, request identification information, and destination
10 identification information, these sets of association are correlated.

[Claim 43]

A computer readable storing medium in which the control program according to claims 15 to 28 is stored.

15 [Detailed Description of the Invention]

[0001]

[Technical Field]

The present invention relates to a central control apparatus, particularly to a central control apparatus for remotely managing an
20 image forming apparatus through an intermediate device.

[0002]

[Background Art]

As a remote management system for an image forming apparatus, a system is known, in which an intermediate device being connected with
25 one or a plurality of image forming apparatuses is installed in an office of a unspecified client and so forth, and a central control apparatus installed in a service center being a basis for the sales and service communicates with the intermediate device, thereby an image forming apparatus connected to the intermediate device is
30 remotely managed.

[0003]

Then, the intermediate device and the image forming apparatus provide each of the services for a printer, a copier, a facsimile,

a scanner, and so forth, or are installed with an application program for managing the operating status, wherein many of the apparatuses are configured to control the program to activate or stop by an RPC (remote procedure call) from the central control apparatus side.

5 Offices of the customers generally install a firewall for shutting down an illegal access from outside and only one-way access from the intermediate device installed inside of the offices of the customers to the central control apparatus. Therefore, as a conventional means, polling is made on a regular basis from the intermediate device to

10 the central control apparatus and a request from the central control apparatus is transferred to an intermediate device as a response from the polling.

[0004]

[Problems to be Solved by the Invention]

15 However, in a case of using such a conventional means, if the intermediate device having received a request does not carry out polling to the central control apparatus, a response to the request may not be sent back. Specifically, in order to materialize one cycle in which a request generated at the central control apparatus side

20 is acquired by an intermediate device or an image forming apparatus connected with the intermediate device and a response being a process result to the request is returned again to the central control apparatus, two connections have to be established to the intermediate device and to the central control apparatus, whereby efficiency in

25 data communication is a problem.

[0005]

Then, there has been a request for a more efficient data communication system by providing a central control apparatus capable of transferring a request from the central control apparatus for

30 controlling an intermediate device or a process result to the request having received from the intermediate device by lapping and filling the request and the process result in a response to an access from the intermediate device.

[0006]

[Objects of the Invention]

The present invention worked out under the situation has an object to provide a central control apparatus capable of sending back to a request from an intermediate device a response including a process
5 result to the received request and a request for controlling the intermediate device from the central control apparatus side

[0007]

[Means for solving the problems]

10 The invention according to claim 1, worked out for solving the above described problem is a server apparatus connected with one or a plurality of clients, and is characterized by having steps of transferring to the client data in which a newly generated server side request and a response to a client side request are described,
15 and obtaining, from the client, data in which the response to the server side request and a response to the newly generated client side request at the client are described.

[0008]

The invention according to claim 2 is characterized in that, in
20 the server apparatus according to claim 1, the server apparatus executes the client side request and transfers a response to the client side request being output as a result of the execution.

[0009]

The invention according to claim 3 is a server apparatus connected
25 with one or a plurality of clients and characterized by including a storing means including a first memory area for storing a server side request being a request to the client, and a second memory area for storing a client side request being a request from the client and a response from the server apparatus to the request,
30 a request generation means for generating the server side request and storing the request in the first memory area of the storing means, a request acquiring means for acquiring a request including the client side request from the client being connected with the

server apparatus through a communication network, a request distribution means for storing the client side request included in the acquired request to the second memory area of the storing means, a response generation means for reading the client side request from the second storing area of the storing means, 5 generating a response to the request, and storing the generated response in the second storing area, a response collection means for reading the response generated by the response generation means from the second storing area and reads the server side request generated by the request generation means from the first 10 storing means, and a response output means for transmitting the response being read and a response including a server side request to the client being connected.

[0010]

15 Herein, "connection" in the present invention means a status in which a connection is actually established and does not include a status in which a connection has been established once and is released after the connection.

[0011]

20 The invention according to claim 4 is a server apparatus connected with one or a plurality of clients, and characterized by including a storing means including a first memory area for storing a server side request corresponding to a request to the client in association with the request identification information to the request, and a second memory area for storing a client side request 25 corresponding to a request from the client, a response to the request from the server apparatus, and the request identification information of the request in association with each other, a request generation means for generating the server side request, 30 assigning the request identification information for identifying the request, and storing the request in the first storing area of the storing means, a request acquisition means for acquiring a request including association of the client side request with

request identification information and association of a response to the server side request with the request identification information of the server side request from a client having come to connect to the server apparatus through a communication network, a request distribution means for storing the association of the client side request included in the acquired request with the request identification information in the second storing area of the storing means, checking the request identification information associated with the response included in the request with the request identification information assigned to each server side request in the first storing area, and specifying a server side request of the first storing area corresponding to the response, a response generation means for reading a client side request from the second storing area of the storing means, generating a response to the request, associating the response with the request identification information of the client side request, and storing the response in the second storing area, a response collection means for reading association of the response generated by the response generation means with the request identification information of the client side request corresponding to the response, and reading the association of the server side request generated by the request generation means with the request identification information of the request from the first storing area, and a response output means for transferring a response including the association of the read response with the request identification information and the association of a server side request with the request identification information to the client coming to be connected.

[0012]

The invention according to claim 5 is the server apparatus according to claim 4, including a response status management means for judging whether or not a response to the client side request received from the client having come to be connected may be

generated during the connection, generating a response delay notice to the client side request when the response may not be generated, associating the generated response delay notice with the request identification information of the client side request, and storing the association in the second storing area of the storing means, wherein the response collection means reads the association of the response delay notice with the request identification information from the second storing area, and the response output means includes in the response and transfers the association of the read response delay notice with the request identification information.

[0013]

The invention according to claim 6 is characterized in that, in the server apparatus according to claim 4, the request acquisition means acquires a request including the association of the client side request, the request identification information of the request and the sender identification information of a client corresponding to the sender of the request, the request distribution means stores the association of the client side request, the request identification information, and the sender identification information included in the acquired request, in the second storing area, the response collection means reads the association of a response generated by the response generation means, the request identification information of a client side request corresponding to the response, and the sender identification information of the request, from the second storing area, and the response output means includes in the response and transfers the association of the read response, the request identification information and the sender identification information.

[0014]

The invention according to claim 7 is characterized in that, in the server apparatus according to claim 6, the request acquisition

means acquires the request including association of the response,
the sender identification information and the request
identification information, serialized in accordance with a code
being defined by a predetermined address, the request
5 distribution means restores, in accordance with a code defined
by the predetermined address, association of the client side
request, the request identification information and the sender
identification information, included in the acquired request,
the response collection means serializes, in accordance with a
10 code defined by a predetermined address, the read association of
the response, the request identification information and the
sender identification information, and the response output means
includes in the response and transfers the serialized association
of the response, the request identification information and the
15 sender identification information.

[0015]

The invention according to claim 8 is characterized in that, in
the server apparatus according to claim 7, the response collection
means serializes the read request identification information and
20 the sender identification information as a SOAP header and
serializes the read response as a SOAP body.

[0016]

The invention according to claim 9 is characterized in that,
in the server apparatus according to claims 6 to 8, the request
25 generation means generates the destination identification
information of the client corresponding to a destination of the
generated server side request and stores the generated
destination identification information in the first storing area
in association with the server side request, the response
30 collection means reads the association of the sever side request,
the request identification information and the destination
identification information from the first storing area, and the
response output means includes in the response and transfers the

association of the read server side request, the request identification information and the destination identification information.

[0017]

5 The invention according to claim 10 is characterized in that, in the server apparatus according to claim 9, the response collection means serializes the read association of a server side request, the request identification information and the destination identification information, in accordance with a code
10 defined by a predetermined address, and the response output means includes in the response and transfers the serialized association of a server side request, the request identification information and the destination identification information.

[0018]

15 The invention of claim 11 is characterized in that, in the server apparatus according to claim 10, the response collection means serializes the read request identification information and destination identification information as a SOAP header and serializes the read server side request as a SOAP body.

20 [0019]

 The invention according to claim 12 is characterized in that, in the server apparatus according to claims 6 to 8, the request acquiring means acquires the request including a response to the server side request from the client, the request identification
25 information of the request and the destination identification information of a client corresponding to the destination of the request, from a client having come to connect to the server apparatus through a communication network, and the request distribution means checks the request identification information
30 and the destination identification information in association of the response included in the request, with the request identification information and the identification information in association of each server side request in the first storing area,

and specifies a server side request in the first storing area corresponding to the response.

[0020]

The invention according to claim 13 is characterized in that
5 in the server apparatus according to claim 12, the request acquisition means acquires the request including association of the response, the request identification information and the destination identification information, serialized in accordance with a code defined by a predetermined address, and
10 the request distribution means restores the response, the request identification information and the destination identification information, included in the request, in accordance with the code defined by the predetermined address.

[0021]

15 The invention according to claim 14 is characterized by including, in the server apparatus according to claim 11, an attachment processing means for setting a link between the serialized association of a response to a client side request, the request identification information and the sender
20 identification information and the serialized association of a server side request, the request identification information and the destination identification information and associating each other.

[0022]

25 The invention according to claim 15 is a program for causing a general-purpose computer to execute a similar operation of the invention according to claim 1.

[0023]

The invention according to claim 16 is a program for causing
30 a general-purpose computer to execute a similar operation of the invention according to claim 2.

[0024]

The invention according to claim 17 is a program for causing

a general-purpose computer to execute a similar operation of the invention according to claim 3.

[0025]

5 The invention according to claim 18 is a program for causing a general-purpose computer to execute a similar operation of the invention according to claim 4.

[0026]

10 The invention according to claim 19 is a program for causing a general-purpose computer to execute a similar operation of the invention according to claim 5.

[0027]

The invention according to claim 20 is a program for causing a general-purpose computer to execute a similar operation of the invention according to claim 6.

15 [0028]

The invention according to claim 21 is a program for causing a general-purpose computer to execute a similar operation of the invention according to claim 7.

[0029]

20 The invention according to claim 22 is a program for causing a general-purpose computer to execute a similar operation of the invention according to claim 8.

[0030]

25 The invention according to claim 23 is a program for causing a general-purpose computer to execute a similar operation of the invention according to claim 9.

[0031]

30 The invention according to claim 24 is a program for causing a general-purpose computer to execute a similar operation of the invention according to claim 10.

[0032]

The invention according to claim 25 is a program for causing a general-purpose computer to execute a similar operation of the

invention according to claim 11.

[0033]

The invention according to claim 26 is a program for causing
a general-purpose computer to execute a similar operation of the
5 invention according to claim 12.

[0034]

The invention according to claim 27 is a program for causing
a general-purpose computer to execute a similar operation of the
invention according to claim 13.

10 [0035]

The invention according to claim 28 is a program for causing
a general-purpose computer to execute a similar operation of the
invention according to claim 14.

[0036]

15 The invention according to claim 29 is a control method for
causing a general-purpose computer to execute the similar
operation of the invention according to claim 1.

[0037]

The invention according to claim 30 is a control method for
20 causing a general-purpose computer to execute the similar
operation of the invention according to claim 2.

[0038]

The invention according to claim 31 is a control method for
causing a general-purpose computer to execute the similar
25 operation of the invention according to claim 3.

[0039]

The invention according to claim 32 is a control method for
causing a general-purpose computer to execute the similar
operation of the invention according to claim 4.

30 [0040]

The invention according to claim 33 is a control method for
causing a general-purpose computer to execute the similar
operation of the invention according to claim 5.

[0041]

The invention according to claim 34 is a control method for causing a general-purpose computer to execute the similar operation of the invention according to claim 6.

5 [0042]

The invention according to claim 35 is a control method for causing a general-purpose computer to execute the similar operation of the invention according to claim 7.

[0043]

10 The invention according to claim 36 is a control method for causing a general-purpose computer to execute the similar operation of the invention according to claim 8.

[0044]

15 The invention according to claim 37 is a control method for causing a general-purpose computer to execute the similar operation of the invention according to claim 9.

[0045]

20 The invention according to claim 38 is a control method for causing a general-purpose computer to execute the similar operation of the invention according to claim 10.

[0046]

The invention according to claim 39 is a control method for causing a general-purpose computer to execute the similar operation of the invention according to claim 11.

25 [0047]

The invention according to claim 40 is a control method for causing a general-purpose computer to execute the similar operation of the invention according to claim 12.

[0048]

30 The invention according to claim 41 is a control method for causing a general-purpose computer to execute the similar operation of the invention according to claim 13.

[0049]

The invention according to claim 42 is a control method for causing a general-purpose computer to execute the similar operation of the invention according to claim 14.

[0050]

5 The invention according to claim 43 is a computer readable storing medium in which the control program according to claims 15 to 28 is stored.

[0051]

[Description of the Preferred Embodiments]

10 [First embodiment]

[0052]

Hereinafter, a preferred embodiment 1 of the present invention is described with reference to drawings. Fig. 1 is a block diagram illustrating a configuration example of a remote management system according to an embodiment of the present invention.

[0053]

The image forming apparatus remote management system includes an image forming apparatus 4 (a copier, and so forth) as an apparatus being remotely managed, an intermediate device 3 connected with the image forming apparatus 4, and further a central control apparatus 1 connected via the intermediate device 3 and the Internet 50, and causes the central control apparatus 1 to remotely manage each of image forming apparatuses 4 intensively via the intermediate device 3. The intermediate device 3 and the image forming apparatus 4 have a various layer configuration corresponding to the usage environment. For example, in the setting environment A shown in Fig. 1, the intermediate device 3a capable to establish direct connection with the central control apparatus 1 by an HTTP (hyper text transfer protocol) has a configuration of a simple layer under which an image forming apparatus 4a and an image forming apparatus 4b follow as apparatuses being remotely managed. However, in the setting environment B shown in Fig. 1, since four units of image forming apparatuses 4 are set, a load becomes large when only one unit of the intermediate device 3 is

installed. Therefore, an intermediate device 3b capable of establishing direct connection with the central control apparatus 1 by an HTTP forms a layer configuration in which, not only the image forming apparatuses 4c and 4d, but also other intermediate device 3c follow, and the intermediate device 3c has the image forming apparatuses 4e and 4f follow further. In this case, information emitted from the central control apparatus 1 in order to remotely manage the image forming apparatuses 4e and 4f reaches the image forming apparatuses 4e or 4f via the intermediate device 3b and the intermediate device 3c being the lower node. In each installation environment, a firewall 2 is installed considering a security point.

[0054]

The image forming apparatus 4 of the present embodiment has installed application programs for providing services of a copier, a facsimile, a scanner, and so forth. The intermediate device 3 has installed an application program for managing and controlling the image forming apparatus 4 connected thereof.

[0055]

The central control apparatus 1 has installed an application program for managing and controlling each intermediate device 3 and further for managing and controlling the image forming apparatus 4 via the intermediate device 3. Then, each node of the present embodiment is configured to be capable of sending a 'request' which is a process request to a method of an application program being installed each other and acquiring a 'response' which is a result of the requested process, by an RPC (remote procedure call). Specifically, the intermediate device 3 or the image forming apparatus 4 (hereinafter, refer to as an intermediate device side) connected to thereof generates a request to the central control apparatus 1 (hereinafter, referred to as an intermediate device side request) and transfers the request to the central control apparatus 1, wherein a response to the request may be acquired, while the central control apparatus 1 generates a request to the intermediate device side

(hereinafter, referred to as a central control apparatus side request) and transfers the request to the intermediate device side, whereby a response to the request may be acquired.

[0056]

5 The relationship is described in detail using a conceptual diagram of a data sending/receiving model shown in Fig. 2.

[0057]

Fig. 2(A) shows a case in which the image forming apparatus 4 generates a request to the central control apparatus 1. In this case, a model is that the image forming apparatus 4 generates an intermediate device side request a and the central control apparatus 1 having received the request through the intermediate device 3 returns a response a to the request. Another case may be considered, wherein a plurality of the intermediate device 3 shown in Fig. 2(A) are provided (the image forming apparatus 4e or 4f shown in Fig. 1). Fig. 2(A) displays a case in which not only the response a but also response delay notification a' are returned. As described in details afterwards, this is because the configuration is such that the central control apparatus 1 receives an intermediate device side request from the connected intermediate device 3, and when it is judged that a response to the request may not be returned during the connection therewith, a response delay notification is informed and the connection is once cut out and a response to the request is returned in the time of a next connection.

25 [0058]

Fig. 2(B) is a case in which the intermediate device 3 generates a request to the central control apparatus 1. In this case, a model is that the intermediate device 3 generates, for example, an intermediate device side request b and the central control apparatus 1 which has received the request returns a response b to the request. As same in the case in Fig. 2(A), when a response may not be returned immediately, a response delay notification b' is returned in the case of Fig. 2(B).

[0059]

Fig. 2(C) is a case in which the central control apparatus 1 generates a request to the image forming apparatus 4. In this case, a model is that the central control apparatus 1 generates a central control apparatus side request c and the image forming apparatus 4 which has received the request c via the intermediate device 3 returns a response c to the request. As same in the case in Fig. 2(A), when a response may not be returned immediately, a response delay notification c' is returned in the case of Fig. 2(C).

10 [0060]

Fig. 2(D) is a case in which the central control apparatus 1 generates a request to the intermediate device 3. In this case, a model is that the central control apparatus 1 generates a central control apparatus side request d and the intermediate device 3 which has received the request returns a response d to the request. As same in the case in Fig. 2(A), when a response may not be returned immediately, a response delay notification d' is returned in the case of Fig. 2(D).

[0061]

20 In the cases of Figs. 2(A) and 2(B), immediately after a request is generated, the intermediate device 3 establishes a connection with the central control apparatus 1 and may transfer the request being included in an HTTP request. However, in the cases of Figs. 2(C) and 2(D), since a firewall installed in the intermediate device side shuts out an HTTP request from the central control apparatus 1, the request may not be immediately transferred by accessing from the central control apparatus side to the intermediate device. In the present embodiment, a specific process of a message collection and distribution is performed, whereby transfer of the request even in 25 the cases of Figs. 2(C) and 2(D) is smoothly performed.

30 [0062]

Also, as described in detail later, in the preset embodiment, SOAP (simple object access protocol) is used as a protocol for transmitting

the argument and return value of an RPC.

[0063]

The physical configuration of the central control apparatus 4 shown in Fig. 1 is described. The control unit includes a CPU not shown,
5 a real-time clock circuit, a ROM, a RAM, a nonvolatile memory, an input/output port, and serial communication control unit, a system bus, and so forth.

[0064]

The physical configuration of the intermediate device 3 shown in
10 Fig. 1 is described. The intermediate device 3 includes a CPU, a ROM, a RAM, a nonvolatile memory, a real-time clock circuit, a LED display unit, a system bus, and network interface card (hereinafter, referred to as NIB), and so forth.

[0065]

15 A physical configuration of the central control apparatus 1 shown in Fig. 1 is described with reference to Fig. 3. The central control apparatus 1 includes a CPU10, a ROM11, a RAM14, a nonvolatile memory 13, a NIC12, and so forth. The detail of these component parts is described in the following. The CPU10 generally controls the entire
20 central control apparatus 1 by a control program in the ROM11. Then, the ROM11 is a read-only memory for storing various fixed data including a control program being used by the CPU10. The RAM14 is a temporary memory being used as a working memory when the CPU10 performs a data processing. The nonvolatile memory 13 is a storage
25 memory which maintains a memory content even if the power source of the central control apparatus 1 is off. A part area of the nonvolatile memory 13 is secured as a command-pool 13a, and further, another area is secured as a request-pool 13b. The contents of the command-pool 13a and the request-pool 13b are described in detail later in the
30 operation description column. The NIC12 performs information receiving/sending with the intermediate device 3 via the Internet 50.

[0066]

Fig. 4 is a functional schematic diagram of a process which the

CPU10 executes for realizing a message distribution and collection process being a characteristic process of the present embodiment. For realizing the message distribution and collection process, the CPU10 functions as a communication control unit 10a, a response collection
5 unit 10b, a request distribution unit 10c, a request generation unit 10d, and a response generation unit 10e.

[0067]

First, each function of these units is described briefly.

[0062]

10 The communication control unit 10a is configured to acquire an HTTP request from the intermediate device 3, and to transfer an HTTP response to the intermediate device 3 as well. The communication control unit 10a functions as a multipart analysis unit 10a' in which the HTTP request described in accordance with an MIME (multipurpose
15 internet mail extension) multi part is divided into a SOAP envelope for each part and transferred to the request distribution part 10c. Further, the communication control unit 10a also functions as a multi part generation unit 10a'' in which each SOAP envelope is assembled as a MIME multi part. A specific content of a SOAP envelope of the
20 present embodiment is described in detail later.

[0068]

The response collection unit 10b is configured to read a response to an intermediate device side request from the request-pool 13b and read a central control apparatus side request from the command-pool
25 13a. Also, the response collection unit 10b functions as a response serialization unit 10b' in which the read response and the central control apparatus side request are serialized as SOAP envelopes.

[0070]

The request distribution unit 10c is configured to store an
30 intermediate device side request included in the HTTP request to the request-pool 13b and store a response from a central control apparatus side and included in the HTTP request to the command-pool 13a. Also, the request distribution unit 10c functions also as a request

restoration unit 10c' in which the SOAP envelope included in the HTTP request is converted into a predetermined data format capable of being executed by an application installed in the central control apparatus 1.

5 [0071]

The request generation unit 10d generates a central control apparatus side request and stores it to the command-pool 13a.

[0072]

10 The response generation unit 10e is configured to read an intermediate device side request from the request-pool 13b, generate a response to the request, and store the generated response to the request-pool 13b.

[0073]

15 Next, a detailed operation in a request collection and distribution process is described referring to a flowchart.

[0074]

Fig. 5 is a flowchart illustrating a fundamental operation of a request collection and distribution process.

[0075]

20 The communication control unit 10a acquires an HTTP request from the intermediate device 3 (S100). Fig. 6 specifically shows a code of an HTTP request according to the present embodiment. In the present embodiment, the HTTP request being transmitted to the central control apparatus 1 by the intermediate device 3 provides a plurality of multi
25 part in accordance with a MIME multi part. To each part, each SOAP envelope described in an XML (extensible markup language) is embedded. For the example in Fig. 6, in an HTTP body of the HTTP request, each element divided with "MIME_boundary" forms independent first part, second part, third part and fourth part. The same configuration is
30 applied to the HTTP response being transferred from the central control apparatus 1 to an intermediate device side.

[0076]

Next, the multi apart analysis unit 10a' divides the HTTP body

of the acquired HTTP request into each part (S200). Specifically, the body of the HTTP request described in Fig. 6 is divided into an element divided with "MIME_boundary". In the following, a specific example in the present invention is described, wherein a SOAP envelope
5 being included in the http Request may be transferred from an intermediate device side to the central control apparatus 1. The SOAP envelope being included in the HTTP request and being transferred may be one being described with an intermediate device side request or one being described with a response to a central control apparatus
10 side request.

[0077]

Fig. 7 illustrates an SOAP envelope being described with an example to an intermediate device side request. First, according to Fig. 7, as an attribute of an "Envelope" tag, an address defined a name space
15 is assigned. In the example of Fig. 7, a unique name space definition is performed in addresses of "www.xxxxx" and "www.yyyyy" other than a name space defined by SOAP as a standard. Therefore, as for a XML tag attached with a name space prefix of "n", the destination of "www.xxxxx" is referred, and as for a XML tag attached with a name
20 space prefix of "ns", the destination of "www.yyyyy" is referred, whereby the structures of the XML tags and definition of the data patterns to be transferred may be acquired. The "SOAP header" in Fig. 7 includes necessary information for the central control apparatus 1 which received the SOAP envelope to identify the intermediate device
25 side request and the sender. In other words, the XML tag of "request ID" makes association with request identification information of the intermediate device side request. The XML tag of "sender" associates the sender identification information of the intermediate device 3 having generated the intermediate device side request or of the image
30 forming apparatus 4 with. Herein, since the XML tag of "intermediate device ID" is described, it is recognized that the sender of the intermediate device side request is the intermediate device 3 (the case of Fig. 2(B) in above). On the other hand, when the sender is

the image forming apparatus 4 (the case of Fig. 2(A) in above), the XML tag of "image forming apparatus ID" instead of "intermediate device ID" is described. Then, in the SOAP body of Fig. 7, a method for requesting a process and argument being transferred and so forth are
5 described.

[0078]

Fig. 8 shows a SOAP envelope described with an example of a response to a central control side apparatus. The definition of a name space is same for that in Fig. 7. The "SOAP header" in Fig. 8 includes
10 necessary information for the central control apparatus 1 which received the SOAP envelope to identify the intermediate device side request and the sender of the response. In other words, the XML tag of "request ID" associates the request identification information of a central control apparatus side request to the response. The XML
15 tag of "sender" associates the sender identification information of the image forming apparatus 4 having generated the response and the sender identification information of the intermediate device 3 which goes through the image forming apparatus 4. As describing later, when a central control apparatus side request is generated at the central
20 control apparatus 1, it is configured to transfer an SOAP envelope being described with the request identification information of the generated request in association with the "request ID" tag and the identification information of the intermediate device 3 being a destination of the central control apparatus side request or of the
25 information forming apparatus 4 in association with an XML tag of "destination". On the other hand, the intermediate device 3 having received the central control apparatus side request or the image forming apparatus 4 transmits a SOAP envelope being described in association of the request identification information being described
30 in the received SOAP with the XML tag of the "request ID" shown in Fig. 8 and in association of the self identification information of the XML tag of the "sender" shown in Fig. 8. Therefore, in the central control apparatus 1, a relation of a request transferred to an

intermediate device side, a response returned to the request and the destination may be checked.

[0079]

An XML tag in the "status" shown in Fig. 8 is to associate
5 information for identifying at a central control apparatus side
whether the SOAP envelope of the response includes a return value being
a process result to the central control apparatus side request or a
value for returning a response delay notification. When the tag
includes a return value, it is noted that "OK" is described, and when
10 the tag includes a value for returning a response delay notification,
it is noted that "Delay" is described. Also, in the SOAP body shown
in Fig. 8, a return value and so forth being a process result to the
received central control apparatus side request is described when the
value associated by the XML tag in the "status" is "OK", and nothing
15 is described when the value associated by the XML tag of the "status"
is "Delay".

[0080]

Any one of the intermediate device side request or the response
to a central control apparatus side request as described in above is
20 to be embedded in an HTTP body of the HTTP request as an independent
SOAP envelope.

[0081]

Next, the request distribution unit 10c judges whether the SOAP
envelope embedded in the first part of the HTTP request is for
25 describing an intermediate device side request, and performs a
registration process of the intermediate device side request when the
SOAP envelope is the intermediate device side request (S300). Herein,
the judgment whether the SOAP envelope is for describing an
intermediate device side request or a response to a central control
30 apparatus side request is performed by referring to a SOAP header.
Specifically, if an XML tag of "request" is described in a SOAP header,
it may be determined that the SOAP envelope is for an intermediate
device side request. On the other hand, an XML tag of "response" is

described on the SOAP header, it is determined that the SOAP envelope is for a response to a central control apparatus side request (or the delay notice).

[0082]

5 Fig. 9 illustrates a detailed flow of a registration process of an intermediate device side request. In the step of S301, the request restoration unit 10c analyses an XML document of a SOAP envelope being the process target, and an application program of the central control apparatus 1 converts to a data format capable of executing the document.
10 Then, in the step of S302, the request distribution means generates a request sheet based on the converted data. The request sheet is a data record being generated at every time when the intermediate device side request is acquired for managing a status of acquiring a response to an intermediate device side request.

15 [0083]

 In the step of S303, the request distribution unit 10c stores the generated request sheet to the request-pool 13b. The data configuration of the request sheet is shown in Fig. 10(A). The "request ID" in Fig. 10(A) is request identification information being
20 described in association with the XML tag of "request ID" in the SOAP header shown in Fig. 7. The "sender identification information" in Fig. 10(A) is sender identification information being described in association with the XML tag of "sender" in the SOAP header shown in Fig. 7. "Status" of Fig. 10(A) is a flag for managing a process status
25 to an acquired intermediate device side request, is set as "unprocessed" at an initial stage for generation, and, then later, is transit to "waiting for processing" → "in process" → "delay unnoticed" → "process completed" → "responded". However, when generation of the response delay notification is not necessary, it
30 is transit to "process completed" immediately after "unprocessed". "Method name" is information to specify a method of the central control apparatus 1 to which a process is requested by an intermediate device side request, and is assigned from an intermediate device side by being

described in the SOAP body shown in Fig. 7. "Input parameter" is an argument to be transferred to the method, and is assigned from an intermediate device side by being described in the SOAP body shown in Fig. 7 as well. "Output parameter" is a return value to be output as a process result to an intermediate device side request. "Request handler" is reference information to a request handler being a service for performing a process to follow after receiving the argument being described in the input parameter.

[0084]

10 In the step of S304, the response generation unit 10e inquires, to the request handler being described with the position in the request sheet, whether the execution result is issued or not. When the execution result may not be issued, in the step of S305, the response generation unit 10e changes a "status" flag of a request of the request-pool 13b to "delay unnoticed". Herein, the "delay unnoticed" flag, as described later, is configured to be changed to "waiting for processing" after the central control apparatus 1 generates a response delay notice and transfers the notice to the central control apparatus 1 side. When the execution result may be issued immediately, the response generation unit 10e passes the argument read from the "input parameter" of the request sheet to the request handler assigned on the request sheet for requests a process. Also, the response generation unit 10e searches as needed for request sheets of which "status" flag is in "waiting process" and are able to be executed. 25 When a request sheet being able to issue an executed result is found through the search, a "status" of a flag in the request sheet is changed to "in process" in the step S306, and further requests a process to request handler same as in the step S308. In the step S308, a process is executed by the request handler having received the request. In the step S309, a return value being output by a request handler as an execution result is stored to the "output parameter" of a request sheet. And, in the succeeding step, the response generation unit 10e changes a flag of "status" of the request sheet to "process completed". 30

[0085]

On the other hand, the central control apparatus 1 performs a registration process of a central control apparatus side request in parallel with the basic operation as being described. The

5 registration process of a central control apparatus side request is a process in which, at every time when a request of an intermediate device side is generated, a command sheet for managing the request is generated and stored to the command-pool 13a.

[0086]

10 Fig. 11 illustrates a detailed flow of a registration process of the central control apparatus side request. When a request to an application program being installed either on the intermediate device 3 or the image forming apparatus 4 is generated, the request generation unit 10d generates a command sheet of a central control apparatus side
15 request in the step of S10. For managing a return status of a response to a central control apparatus side request being transferred to an intermediate device side, the command sheet is data record being generated for each of the central control apparatus side requests. Then, in the step of S20, the request generation unit 10d registers
20 the generated command sheet to the command-pool 13a. In the step of S30, the request generation unit 10d assigns the number to an ID being assigned from the command-pool 13a to the central control apparatus side request. A data configuration of a command sheet is illustrated in Fig. 10(B). The "request ID" in Fig. 10(B) is request
25 identification information for identifying the central control apparatus side request, and corresponds to the assigned ID. The "status" in Fig. 10(B) is a flag for managing a process state to the generated central control apparatus side request, wherein the "state" in the initial stage of generation is set as "not transmitted yet",
30 and then, is transit as "response delayed" → "response having received". "Address identification information" is identification information of the intermediate device 3 being final transmitted end of the generated request or the image forming apparatus 4. "Method

name" is information for assigning a method of an intermediate device side to which a process is requested by a central control apparatus side request. "Input parameter" is an argument to be transferred to the method. "Command result" is a return value being described in
5 a SOAP envelope being returned as a response to the central control apparatus side request. "Result handler" is reference information which is a result handler a server apparatus for requesting a process following to transfer of the return value.

[0087]

10 Back Fig. 5, the request distribution unit 10c performs a response notification process when the SOAP envelope embedded in the first part of the HTTP request is not an intermediate device side request (S400).

[0088]

Fig. 12 shows a detailed flow of the response notification process.
15 In a response notification process, the request distribution unit 10c determines whether the SOAP envelope to be a target of the response delay notice is a response being described with a return value or a response being described with a response delay notice. When it is a response being described with a response delay notification,
20 the request distribution unit 10c notifies the response delay notice to a command sheet corresponding to the command-pool 13a in the step of S401. Herein, whether the SOAP envelope is one being described with a return value or one being described with a response delay notice is determined by referring a value associated with the "status" XML
25 tag of the SOAP header. Specifically, as described in Fig. 8, when the SOAP envelope is described as "Delay" in association with the "status" XML tag, it is determined that the SOAP envelop is described with a response delay notice. Then, in the following step of S402, the request distribution unit 10c changes the "status" flag of the
30 command sheet to "response delay".

[0089]

On the other hand, when the SOAP envelope is determined not the one being described with a response delay notice, the request

distribution unit 10c analyzes an XML document of a SOAP envelope being the process target, and the application of the central control apparatus 1 changes it to a data format being able to be executed in the step of S403. Then, in the step of S404, the request
5 distribution unit 10c stores the return value contained in the SOAP envelope to "command result" of the command sheet corresponding to the command 13b. Herein, as described in Fig. 8, the return value is one described in the SOAP body of a SOAP envelope. In the step of S405, the request distribution unit 10c changes the "status" flag
10 of the command sheet to "response having received". In the step of S406, the request distribution unit 10c transfers a return value read from "command result" of the command sheet to the result handler assigned to the request sheet and requests a succeeding process.

[0090]

15 The registration process of an intermediate device side request or the response generation process as described in above is repeated in the second part onwards until a process about all the parts included in the HTTP request is completed.

[0091]

20 Next, the response collection unit 10b performs a collection process of a request to a target client (S500). The "target client" means the intermediate device 3 being established current connection with the central control apparatus 1 and the image forming apparatus 4 which comes under the intermediate device 3. For example, in case
25 of an example of a connection environment A in Fig. 1, when the intermediate device 3a comes to connect, the intermediate device 3a and the image forming apparatus 4a and 4b which come under the intermediate device 3a are specified as target clients.

[0092]

30 In Fig. 13, a detailed flow of the collection process of the request is shown. In S501, the response collection unit 10b reads, from the command pool 13a, a central control apparatus side request which has not been transmitted to a target client. Specifically, a command

sheet in which identification information described in "destination identification information" agrees with any one of target clients and the "status" flag is "not transmitted" is specified among each command sheet of the command pool 13a, and a request ID described, destination
5 identification information, method name and input parameter in the command sheet are read. In the succeeding step of S502, the response serialized unit 10b' changes the contents ready in the step of S501 to an XML document being a SOAP envelope and stores to RAM14. In the step S503, the multipart generation unit 10a'' generates a part in
10 which the converted SOAP envelope is embedded, and transfers to the communication control unit 10a. In the step of S504, the response collection unit 10b changes the "status" flag in each command sheet which is specified in above into "waiting for response". The process described in above is repeated to all the central control apparatus
15 side requests which have not been transmitted to target clients.

[0093]

Back in the description of Fig. 5, the response collection means performs a collection process of a response to a target client (S600). The meaning of "target client" is the same as in above.

20 [0094]

In Fig. 14, a detailed flow of a collection process of the response is described. First, in the step of S601, the response collection unit 10b reads a response of a process completed or a delay unnoticed of a target client from the request-pool 13b. Specifically, first,
25 a request sheet in which "sender identification information" agrees with any one of target clients and the "status" flag is "delay unnoticed" or "process completed" is specified among each request sheet of the request-pool 13b, a request ID, sender identification information, method name in the command sheet described in the request
30 sheet are read, and, further when it is a request sheet of which "status" flag is "process completed", the output parameter is also read out.

[0095]

For a request sheet of which "status" flag is "delay unnoticed", the response collection unit 10b generates delay notice and the response serialization unit 10b' converts it to an XML document becoming a SOAP envelope in the step S602. On the other hand, for
5 a request sheet of which "status" flag is "process completed", the response serialization unit 10b' converts the contents read in the step of S601 to an XML document becoming a SOAP envelope, and stores it to the RAM 14 in the step S603. Herein, a specific example is cited about a SOAP envelope which may be included in the HTTP response of
10 the present embodiment and transferred from the central control apparatus 1 to the intermediate device 2. The SOAP envelope to be transferred by included in an HTTP response includes one being described with a response a central control apparatus side request and one being described with an intermediate device side request.

15 [0096]

Fig. 15 shows a SOAP envelope being described with an example of a central control apparatus side request. First, at an attribute of an "envelope" XML tag, a name space is defined and the configuration of the XML tag and data type information being transferred are acquired
20 by referring to the definition of the name space, as same in case of Figs. 7 and 8 as described in above. The SOAP header in Fig. 15 includes necessary information for the intermediate device 3 or the image forming apparatus 4 having received the SOAP envelope to identify the central control apparatus side request and the destination.
25 Specifically, the "request ID" XML tag associates request identification information described in the "request ID" of the command sheet of the command-pool 13a, and the "destination" XML tag associates the destination identification information described in the "destination identification information" on a command sheet of
30 the command-pool 13a. As described by referring to Fig. 1, in the present embodiment, even a SOAP envelope being described with a central control apparatus side request to the image forming apparatus 4 is configured to be transferred to the intermediate device 3 first, and

then to the image forming apparatus 4 by the intermediate device 3. The intermediate device 3 having received the SOAP envelope being described with the intermediate device side request determines whether the SOAP envelope is addressed to itself or the one to transfer to the lower positioned node further by referring to the identification information associated with the "destination" XML tag. The point that a method for requesting a process or an argument and so forth are described in the SOAP body of the SOAP envelope is same with the description at Fig. 7 in above.

10 [0097]

Fig. 16 shows a SOAP envelope being described with a response to an intermediate device side request. The points that the attribute of an XML tag defines a name space and configuration of the XML tag and data type information may be transferred by referring to the definition of the name space are same in cases of Figs. 7 and 8. The SOAP header in Fig. 16 includes information necessary for the intermediate device 3 having received the SOAP envelope or the image forming apparatus 4 to identify the sender of the request. Specifically, the "request ID" XML tag associates the request identification information described in the "request ID" of a request sheet of the request-pool 13b, and the "destination" XML tag associates the identification information described in the "sender identification information" of a request sheet of the request-pool 13b. As same as the SOAP envelope of the central control apparatus side request in Fig. 1, the intermediate device 3 having acquired a SOAP envelope being described with the intermediate device side request determines whether it is addressed for itself or not by referring to the "destination" tag, and when it is not addressed to itself, it is configured to transfer to a lower positioned node. Herein, in Fig. 16, "NONE" is described in association with the "image forming apparatus ID" tag. The description of "NONE" means to indicate that transfer to any of the image forming apparatus 4 to be connected as a lower position node of the intermediate device 3 is

unnecessary and that the final destination is the intermediate device 3. In Fig. 16, such points are same in Fig. 8 that the information for identifying whether the SOAP envelope includes a return value being a process result to the intermediate device side request or a response delay information is associated with and described in a "status" XML tag, and that the SOAP body in Fig. 16 is described with a return value when the value associated with the "status" tag is "OK", and when the value associated with the "status" tag is "delay", nothing is described in the SOAP body.

10 [0098]

In the succeeding step of S604, the multi part generation unit 10a'' generates a part being embedded with the converted SOAP envelope and transfers to the communication unit 10a. In the step of S605, the response collection unit 10b changes the "status" flag of the each request sheet. Specifically, "delay unnoticed" of the "status" of the flag is changed to "waiting for a process", and "process completed" is changed to "response completed".

[0099]

20 Back to the description of Fig. 5, the communication control unit 10a generates an HTTP response including all parts which the multi part generation unit 10a'' has generated in the steps of S503 and S604 (S700).

[0100]

25 Then, the communication control unit 10a transmits the HTTP response which the SOAP request has embedded as a multi part to the intermediate device 3 (S800).

[0101]

All the processes are completed with the above-mentioned steps.

[0102]

30 The intermediate device 3 having received the HTTP response analyses each envelope having embedded in the HTTP response as a multi part. It is configured that, as for a self-addressed SOAP envelope, a process for converting the envelope to a data format in which the

installed application program may execute is immediately performed, and that, as for a SOAP envelope addressed to a lower node, the envelope is transferred to the image forming apparatus 4 being the addressee or other intermediate device 3 as is. After the transferred SOAP envelope reaches the image forming apparatus 4 being the addressee or other intermediate device 3, the SOAP envelope is converted by the image forming apparatus 4 or other intermediate device 3 to a data format compatible for execution by the self installed application program.

10 [0103]

According to the first embodiment as described in above, the central control apparatus 1 requesting a process to the intermediate device 3 or the image forming apparatus 4 stores data necessary in order to request a process to the application program installed in the intermediate device 3 or the image forming apparatus 4, to the command-pool 13a of a non volatile memory 13 as a command sheet. Then, when an HTTP request is received from the intermediate device 3, it is configured that the SOAP envelope being described with an intermediate device side request based on the content of the command sheet is embedded in the HTTP response to the request and transferred to the intermediate device 3. Since the SOAP envelope being described with the central control apparatus side request is transferred as an HTTP response on a protocol of an HTTP, without making it as a problem that there exists a firewall arranged at an intermediate device side, transfer of a central control apparatus side request to an intermediate device side may be realized.

[0104]

Also, it is configured that the central control apparatus 1 describes the central control apparatus side request and a response generated as a process result to an intermediate device side request, both of which are embedded in as each multi part of an HTTP response and transferred. Therefore, the intermediate device 3 have acquired the SOAP envelope or the image forming apparatus 4 may read

configuration of each XML tag of the SOAP envelope and the data format, convert to a data format compatible for execution by the self-installed application program and perform a succeeding process.

[0105]

5 Further, Since in the SOAP header of the SOAP envelope being transferred by being included in the HTTP response, identification information of the intermediate device 3 becoming the addressee of the SOAP envelope or the image forming apparatus 4 is described, not only a SOAP envelope in which the intermediate device 3 itself is
10 addressed but also a SOAP envelope in which the image forming apparatus 4 being a lower node of the intermediate device 3 or other intermediate device 3 is addressed are embedded in an HTTP response and may be transferred to the intermediate device 3. And yet, since each SOAP envelope included in an HTTP request or HTTP response is secured of
15 each independency to others in the resent embodiment, the intermediate device 3 having received an HTTP response may transfer a SOAP envelope which is included in the HTTP and is not addressed to itself to the image forming apparatus 4 in a lower node or other intermediate device 3 without changing the description content of the envelope.

20 [0106]

[Second embodiment]

[0107]

Hereinafter, second embodiment of the present invention is described. Fig. 17 is a schematic diagram for a process function being
25 executed by the CPU10 in the present embodiment. The CPU10 in the present embodiment functions not only as a communication unit 10a, a response collection unit 10b, a message distribution unit 10c, a request generation unit 10d and a response generation unit 10e, but also as a command deletion unit 10f and a request deletion unit 10g.

30 [0108]

The command deletion unit 10f monitors a "status" flag of each command sheet being stored in the command-pool 13a, and when the request distribution unit 10c changes the "status" flag of a command

sheet to "response having received" in the step of S405 shown in Fig. 12, the command sheet is deleted from the command-pool 13a.

[0109]

On the other hand, the request deletion unit 10g monitors a "status" flag of each request sheet being stored in the request-pool 13b, and when the response collection unit 10b changes the "status" of a flag of a request sheet to "response completed" in the step of S605 shown in Fig. 14, the request sheet is deleted from the request-pool 13b.

[0110]

According to the second embodiment as described in above, the command deletion unit 10f deletes a command sheet which has become unnecessary since the response has been transmitted to an intermediate device side from the command-pool 13a, and at the same time, the request deletion unit 10g deletes, from the request-pool 13b, a request sheet which becomes unnecessary since a response has been received from an intermediate device side and a command handler has performed a succeeding process, whereby the non-volatile memory 1413 having limited memory capacity may be efficiently used.

[0111]

[Embodiment examples]

[0112]

In the following, a detailed example based on the embodiment described in above is introduced. As having explained, in the embodiment described in above, in the SOAP header of each SOAP envelope included in the HTTP request being transferred from an intermediate device side to the central control apparatus 1, it is configured that identification information specifying the sender is described. This is because the central control apparatus 1 is for specifying the intermediate device 3 being the sender of the SOAP envelope or the image forming apparatus 4. On the other hand, in the embodiment described in above, in the SOAP header of each SOAP envelope included in the HTTP response being transferred from the central control apparatus 1 to an intermediate device side, it is configured that

identification information for specifying the addressee is described. As described in above, since it is configured that in an intermediate device side, the intermediate device 3 subordinates the image forming apparatus 4 as a further lower node or other intermediate device 3, the intermediate device 3 having received the HTTP response may judge whether each SOAP envelope included in the HTTP response is addressed to itself or to the further lower node by the information described in the SOAP envelope.

[0113]

10 However, for example, when it is desired to distribute a SOAP envelope being described a same request of a central control apparatus side request to all the nodes positioned in lower of the specified intermediate device 3 respectively, it is ineffective since each different SOAP envelope being described with identification information of respective addressee in the SOAP header has to be transferred to the intermediate device 3. Thus, the present embodiment introduces a configuration in which a SOAP envelope being described with "all" the identifier in association with the "destination" XML tag of a SOAP header is transferred to the intermediate device 3, whereby the intermediate device 3 may transfer the SOAP envelope to the image forming apparatus 4 in the lower node or other intermediate device 3.

[0114]

Fig. 18 is a SOAP envelope in which all the intermediate devices 3 are addressees. In the "status" XML tag of Fig. 18, "ALL" is described in "Intermediate device ID" and "NONE" is described in "Image forming apparatus ID". This illustrates that the intermediate device 3 having received the SOAP envelope converts the envelope to the data format which may be processed by an application program as a receiver of the SOAP envelope, and transfers the SOAP envelope as it is to all the subordinating intermediate device 3 and, on the other hand, transferring to the subordinating image forming apparatus 4 is unnecessary. For example, in the installation environment B shown

in Fig. 1, when the intermediate device 3b receives the SOAP envelope in Fig. 18, the envelope is transferred to the intermediate device 3c, but not to the image forming apparatuses 4c to 4f.

[0115]

5 Fig. 19 illustrates an SOAP envelope in which all the image forming apparatuses 4 subordinated under a specific intermediate device 3 are addressee. In the "destination" XML tag of Fig. 19, identification information of the intermediate device 3 such as "ABCABC" is described in the "intermediate device ID", and "ALL" is described in the "Image
10 forming apparatus ID". This illustrates that the intermediate device 3 having received the SOAP envelope has to send the SOAP envelope as it is to every subordinate image forming apparatus 4. For example, in the installation environment B shown in Fig. 1, the intermediate device 3b receives the SOAP envelope of the Fig. 19, and when the
15 "ABCABC" in above is the identification information of the intermediate device 3, the intermediate device 3b transfers the SOAP envelope to the intermediate device 3c as it is, and the intermediate device 3c having received the envelope converts the envelope to a data format available to be processed by an application program and
20 transfers to every subordinating image forming apparatuses 4, specifically image forming apparatuses 4e and 4f.

[0116]

Fig. 20 illustrates a SOAP envelope in which all the intermediate devicees 3 and all the subordinating image forming apparatuses 4 are
25 addressees. In the "destination" XML tag of Fig. 20, "ALL" is described in "Intermediate device ID" and "ALL" is described in "Image forming apparatus ID" too. This illustrates that, as a destination of the SOAP envelope by itself, the intermediate device 3 having received the SOAP envelope has to convert the envelope to a data format
30 available to be processed by an application program and to transfer the SOAP envelope as it is to all the subordinate other intermediate devicees 3 and all the image forming apparatuses 4. For example, in the installation environment B shown in Fig. 1, when the intermediate

device 3b receives the SOAP envelope in Fig. 20, the envelope is converted to a data format available to be processed by an application program and transferred to the image forming apparatus 4c, the image forming apparatus 4d, the intermediate device 3c, and further the
5 intermediate device 3c transfers the SOAP envelope to the image forming apparatuses 4e and 4f.

[0117]

The embodiment described in above is related to a SOAP envelope being described with a central control apparatus side request. A SOAP
10 envelope being described with a response to an intermediate device side request is also to specify the destination in accordance with the same procedure.

[0118]

Herein, embodiments of the present invention are not limited to
15 the ones mentioned in above, but an alternate means generally used by a skilled person may be applied to one of embodiments of the present invention. For example, in the present embodiment, a generated SOAP envelope is stored in the RAM 14, but this may be stored in the non-volatile memory 13. Also, though generation of a SOAP envelope
20 by the response serialization unit 10b' is configured to start when an HTTP request is acquired from the intermediate device 3, it may be configured that, immediately after a central control apparatus side request is generated by the request generation unit 10d, the request is converted to a SOAP envelope and stored to a predetermined area
25 of the non-volatile memory 13, and when an HTTP request is received from the intermediate device 3, the SOAP envelope having been stored is immediately read and an HTTP response including the SOAP envelope is output.

[0119]

30 Also, in the embodiment in above, SOAP is adopted as an upper protocol for realizing a RPC. However, other protocol such as CORBA (common object request broker architecture) or JAVA(R)RMI (remote method invocation) may be adopted.

[0120]

Specifically, exchange of a request and a response to the request between an image forming apparatus and a central control apparatus in the embodiment is configured to be performed by a SOAP message being
5 described in XML. However, a SOAP message is not limited to be described in XML, but may be described in other format.

[0121]

Also, in the embodiment in above, a SOAP envelope included in an HTTP request or an HTTP response is handled as an entirely independent
10 one by adopting not only a SOAP standard protocol, but also a unique protocol in addition. However, the configuration may be such that a link to a SOAP envelope after second part onwards is embedded in the SOAP envelope of first part being included in an HTTP response for association and the SOAP envelope may be transferred by a SOAP
15 attachment being covered by a SOAP standard protocol.

[0122]

Further, the embodiment in above adopts an HTTP as a data communication protocol being positioned lower of a upper protocol such as SOAP. As for the lower protocol, other protocols such as SMTP
20 (simple mail transfer protocol), FTP (file transfer protocol), and so forth may be adopted.

[0123]

[Effects of the Invention]

As configured and functioned as described in above, the present
25 invention may provide a central control apparatus which may return to a request from an intermediate device a response combining a processing result of the received request and a request of the central control apparatus for controlling the intermediate device.

[Brief Description of the Drawings]

30 [Fig. 1]

Fig. 1 is a block diagram illustrating a configuration example of a remote management system.

[Fig. 2]

Fig. 2 is a schematic diagram of a data transmission and receiving model.

[Fig. 3]

Fig. 3 is a block diagram illustrating a physical configuration
5 of a central control apparatus.

[Fig. 4]

Fig. 4 is a functional schematic diagram of a process to be executed by a CPU.

[Fig. 5]

10 Fig. 5 is a flowchart illustrating a fundamental operation.

[Fig. 6]

Fig. 6 is an example of a code for an HTTP request.

[Fig. 7]

Fig. 7 is a SOAP envelope being described with a response to a
15 central control apparatus side request.

[Fig. 8]

Fig. 8 is a SOAP envelope in which a response to a central control apparatus side request is described.

[Fig. 9]

20 Fig. 9 is a flowchart SOAP envelope illustrating a detailed registration process of an intermediate device side request.

[Fig. 10]

Fig. 10 is a data schematic diagram of a request sheet and a command sheet.

25 [Fig. 11]

Fig. 11 is a flowchart illustrating a detailed registration process of a central control apparatus side request.

[Fig. 12]

Fig. 12 is a flowchart illustrating a detailed response
30 notification process.

[Fig. 13]

Fig. 13 is a flowchart illustrating a detailed request collection process.

[Fig. 14]

Fig. 14 is a flowchart illustrating a detailed response collection process.

[Fig. 15]

5 Fig. 15 is a SOAP envelope in which a central control apparatus request is described.

[Fig. 16]

Fig. 16 is a SOAP envelope in which a response to an intermediate device side request is described.

10 [Fig. 17]

Fig. 17 is a functional schematic diagram of a process to be executed by a CPU.

[Fig. 18]

15 Fig. 18 is a SOAP envelope of which destination is all intermediate devicees.

[Fig. 20]

Fig. 20 is a SOAP envelope of which destination is all intermediate devicees and all image forming apparatus subordinating the intermediate devicees.

20 [Description of Numerals]

1 Central control apparatus

2 Firewall

3 Intermediate device

4 Image forming apparatus

25 10 CPU

10a Communication control unit

10b Response collection unit

10c Request distribution unit

10d Request generation unit

30 10e Response generation unit

11 ROM

12 Network interface card

13 Non-volatile memory

13a Request-pool

13b Command-pool

14 RAM

[Name of Document] Drawings

5

[Name of Document] Abstract of the Disclosure

[Abstract]

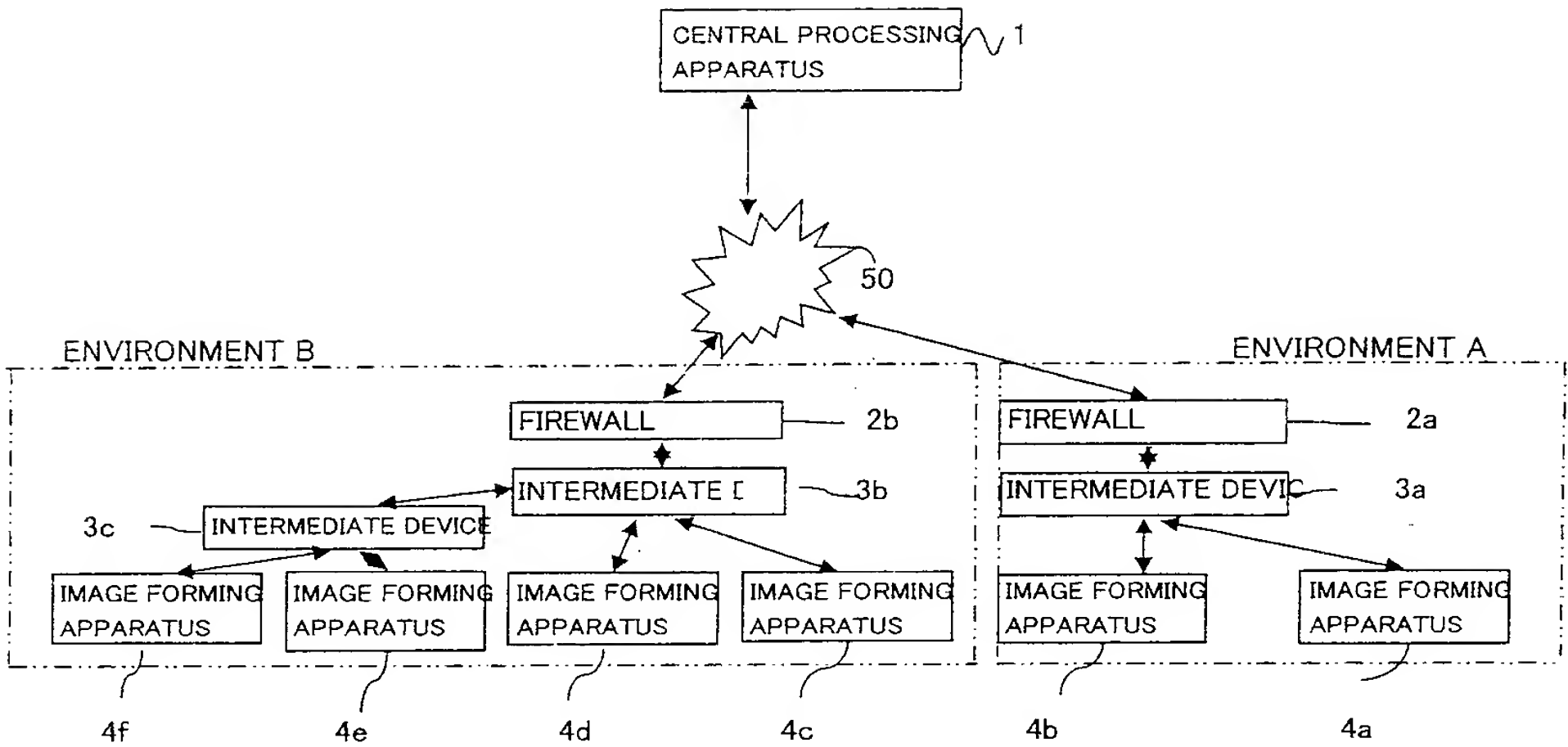
[Objectives of the Invention] To a request from an intermediate
10 device, to return a response combining a processing result to the
received request and a request from a central control apparatus for
controlling the intermediate device.

[Means for Achieving the Objectives]

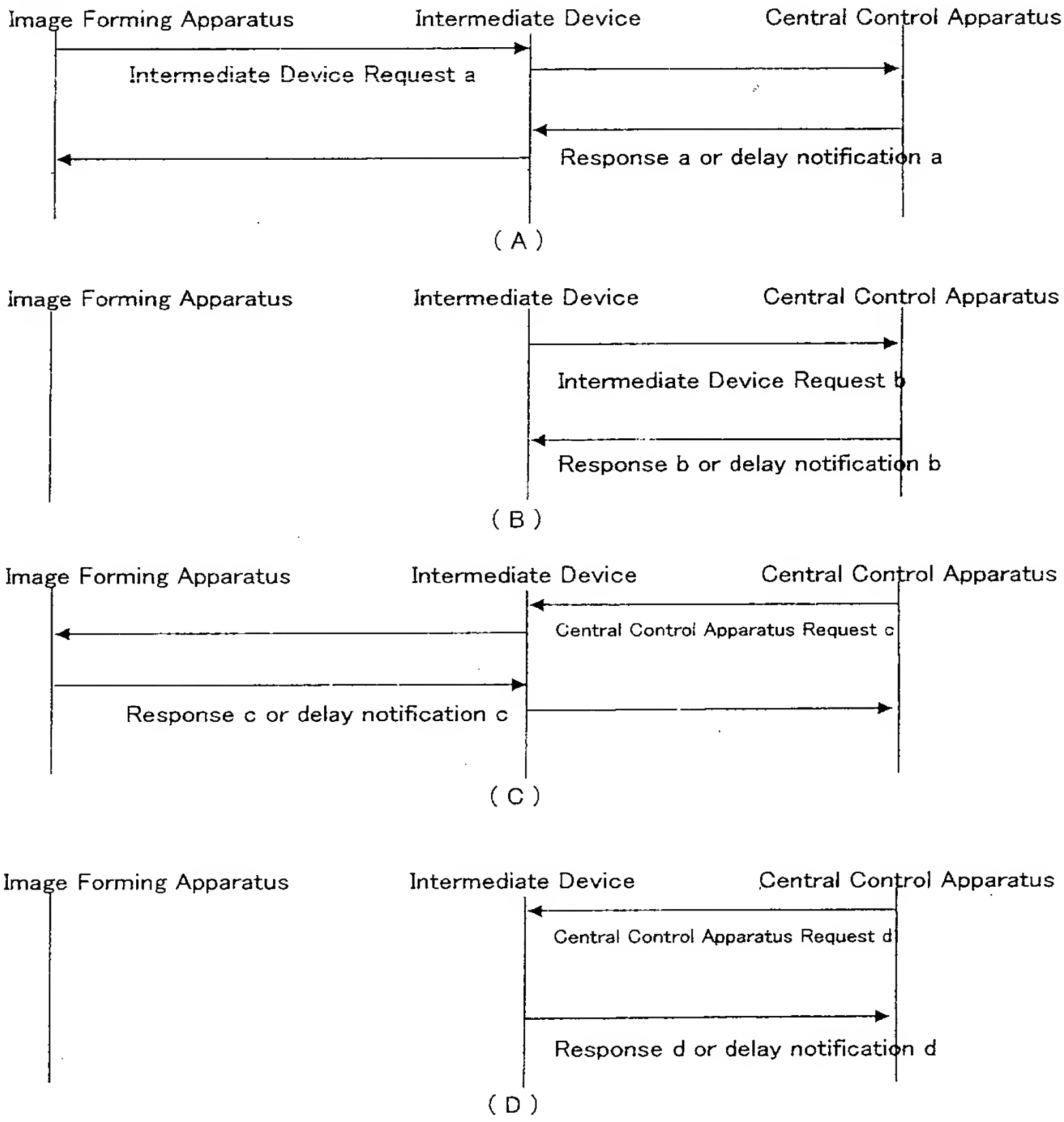
A central control apparatus 1 for retrieving an intermediate device
15 side request included in an HTTP request received from an intermediate
device 3, while generating a response corresponding to a processing
result to the request, storing a central control apparatus side request
corresponding to a request to the intermediate device, whereby the
generated response and the stored central control apparatus side
20 request both embedded in an HTTP response are returned.

[Selected Drawing] Fig. 1

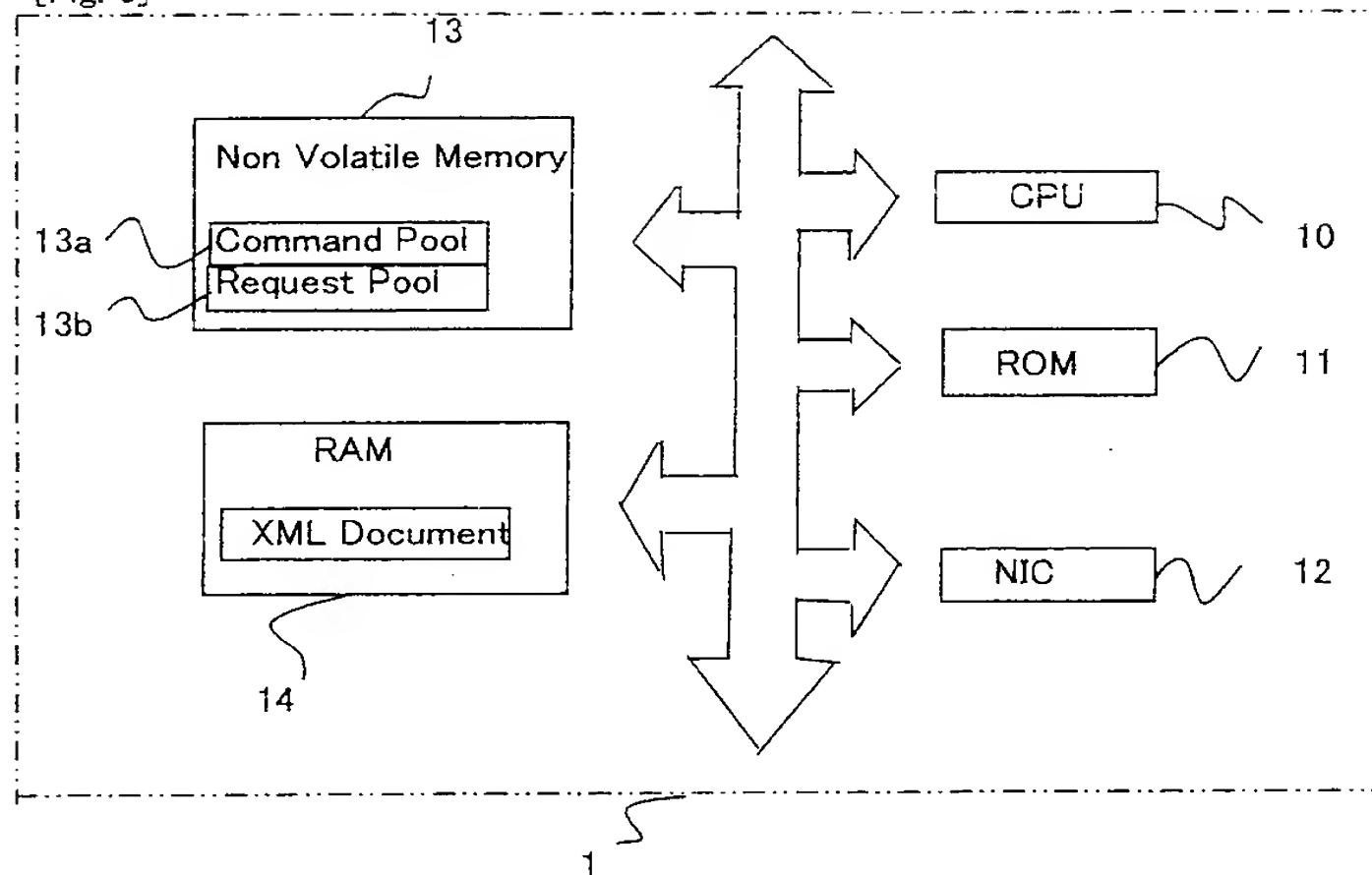
[Fig. 1]



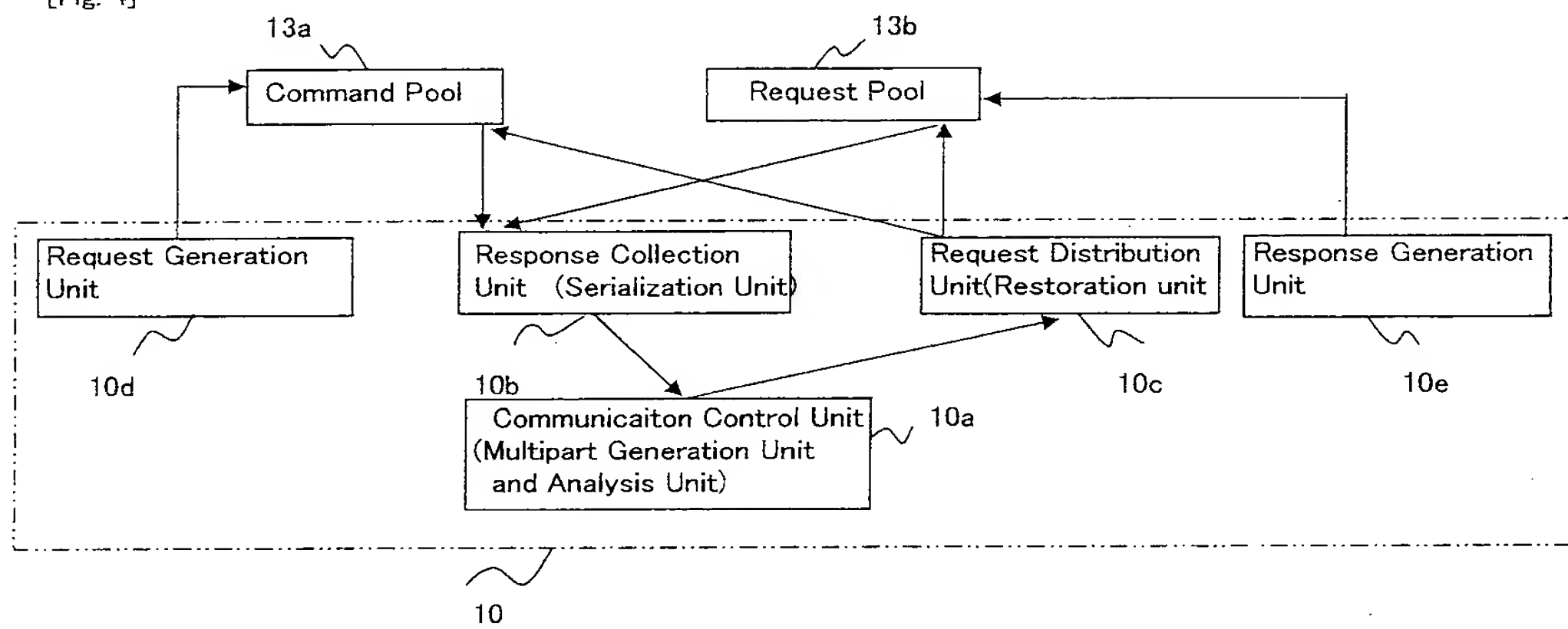
[Fig. 2]



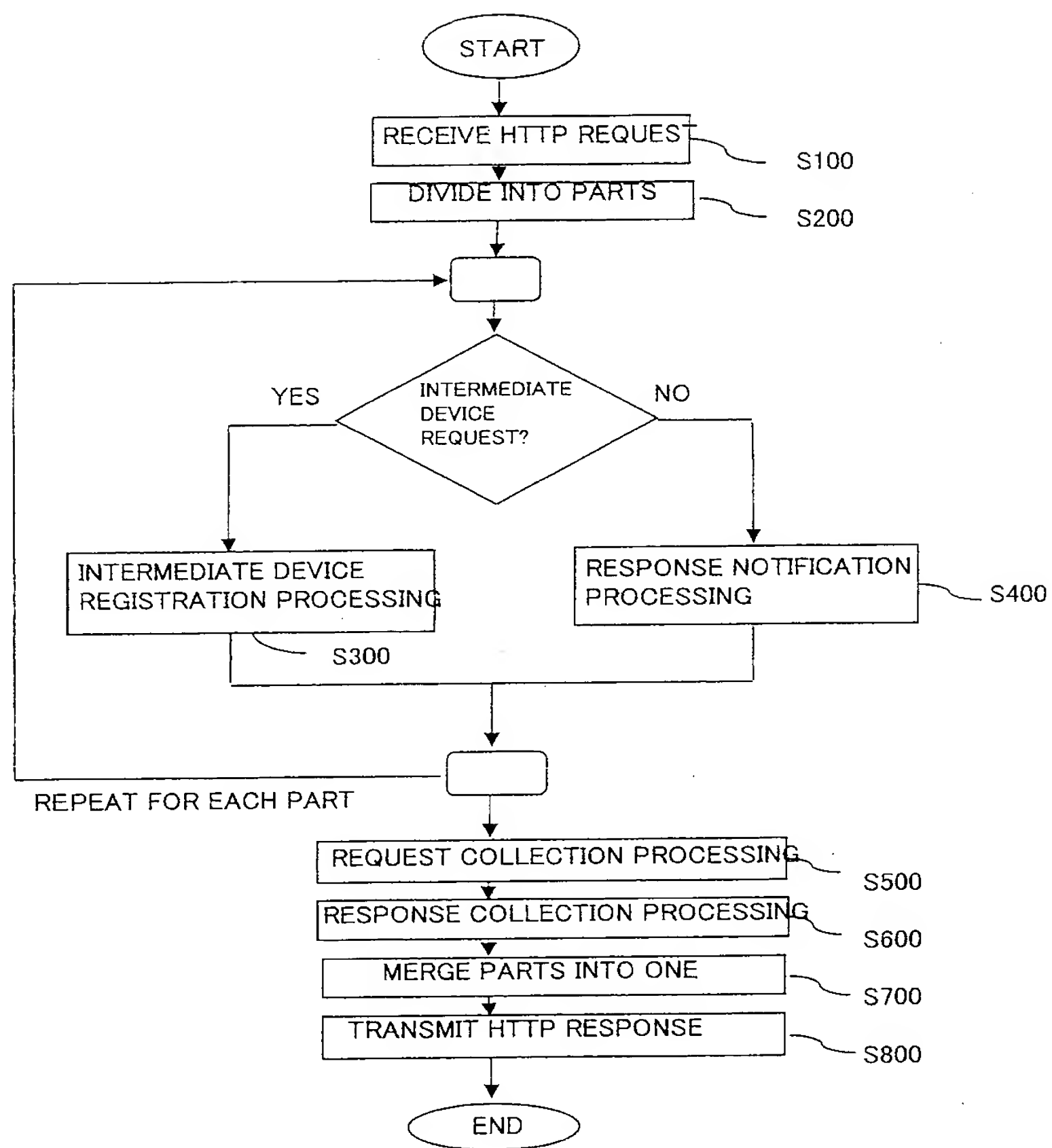
[Fig. 3]



[Fig. 4]



[Fig. 5]



[Fig. 6]

HTTP/1.1 200OK

Content-Type: multipart/mixed; boundary=MIME_boundary

Content-Length: nnnn

--MIME_boundary

Content-Type: text/Xml; charset=UTF-8

Content-Transfer-Encoding: 8bit

<s:Envelope>

</s:Envelope>

PART 1

--MIME_boundary

Content-Type: text/xml; charset=UTF-8

Content-Transfer-Encoding: 8bit

<s:Envelope>

</s:Envelope>

PART 2

--MIME_boundary

Content-Type: text/xml; charset=UTF-8

Content-Transfer-Encoding: 8bit

<s:Envelope>

</s:Envelope>

PART 3

--MIME_boundary

Content-Type: text/xml; charset=UTF-8

Content-Transfer-Encoding: 8bit

<s:Envelope>

</s:Envelope>

PART 4

--MIME_boundary

[Fig. 7]

Content-Type: text/xml; charset=UTF-8

Content-Transfer-Encoding: 8bit

```
< s:Envelope
  xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:se="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:n="http://www.xxxxxx"
  xmlns:ns="http://www.yyyyyy"
  s:encodingStyle="http://schemas.xmlsoap.org/soap/">

  < s:Header >
    < n: REQUEST >
      < REQUEST ID > 1 2 3 4 5 < / REQUEST ID >
      < SENDER >
        < INTERMEDIATE DEVICE ID > ABCABC < / INTERMEDIATE DEVICE ID >
      < / SENDER >
    < /n: REQUEST >
  < /s:Header >

  < s:Body >
    <-- REQUEST CONTENT SUCH AS METHOD NAME, ARGUMENT-->
  < /s:Body >
< /s:Envelope >
```

[Fig. 8]

Content-Type: text/xml; charset=UTF-8

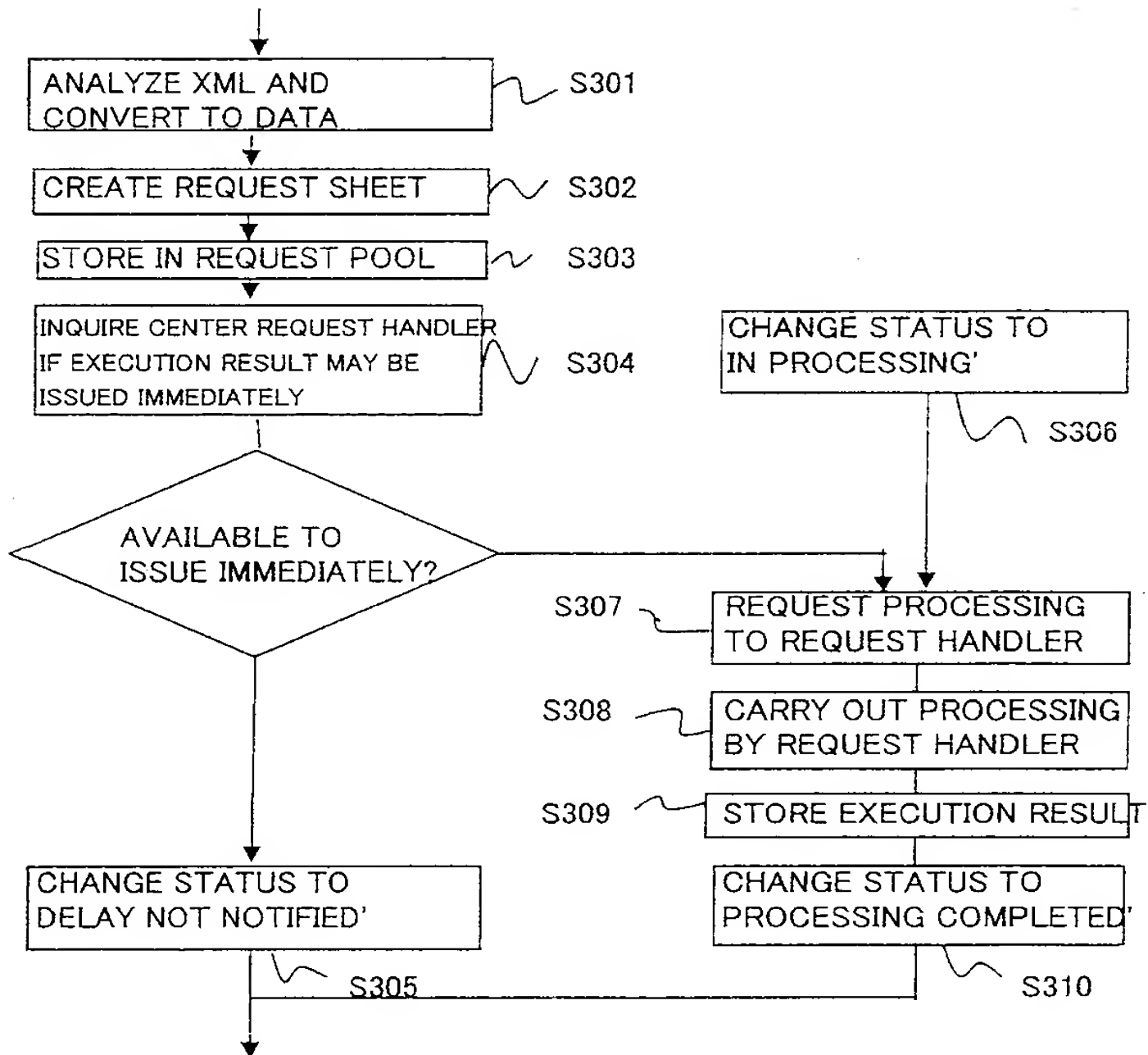
Content-Transfer-Encoding: 8bit

```
< s:Envelope
  xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:se="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:n="http://www.xxxxxx"
  xmlns:ns="http://www.yyyyyy"
  s:encodingStyle="http://schemas.xmlsoap.org/soap/">

  < s:Header >
    < n: REQUEST >
      < REQUEST ID > 10000000 < / REQUEST ID >
      < SENDER >
        < INTERMEDIATE DEVICE ID > ABCABC < / INTERMEDIATE DEVICE ID >
      < / SENDER >
      < STATUS > OK or Delay </STATUS>
    </n:RESPONSE>
  < /s:Header >

  < s:Body >
    <-- RENPONSE CONTENT SUCH AS RETURN VALUE-->
  < /s:Body >
< /s:Envelope >
```

[Fig. 9]

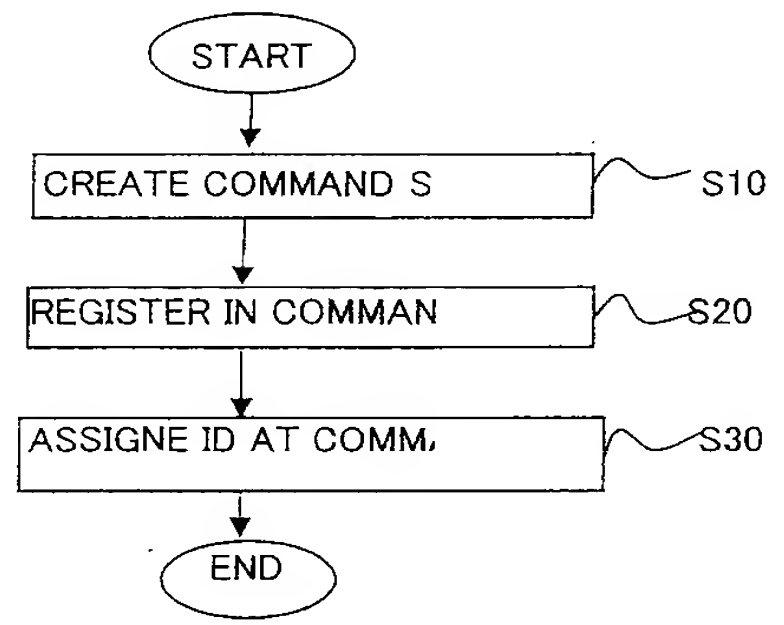


[Fig. 10]

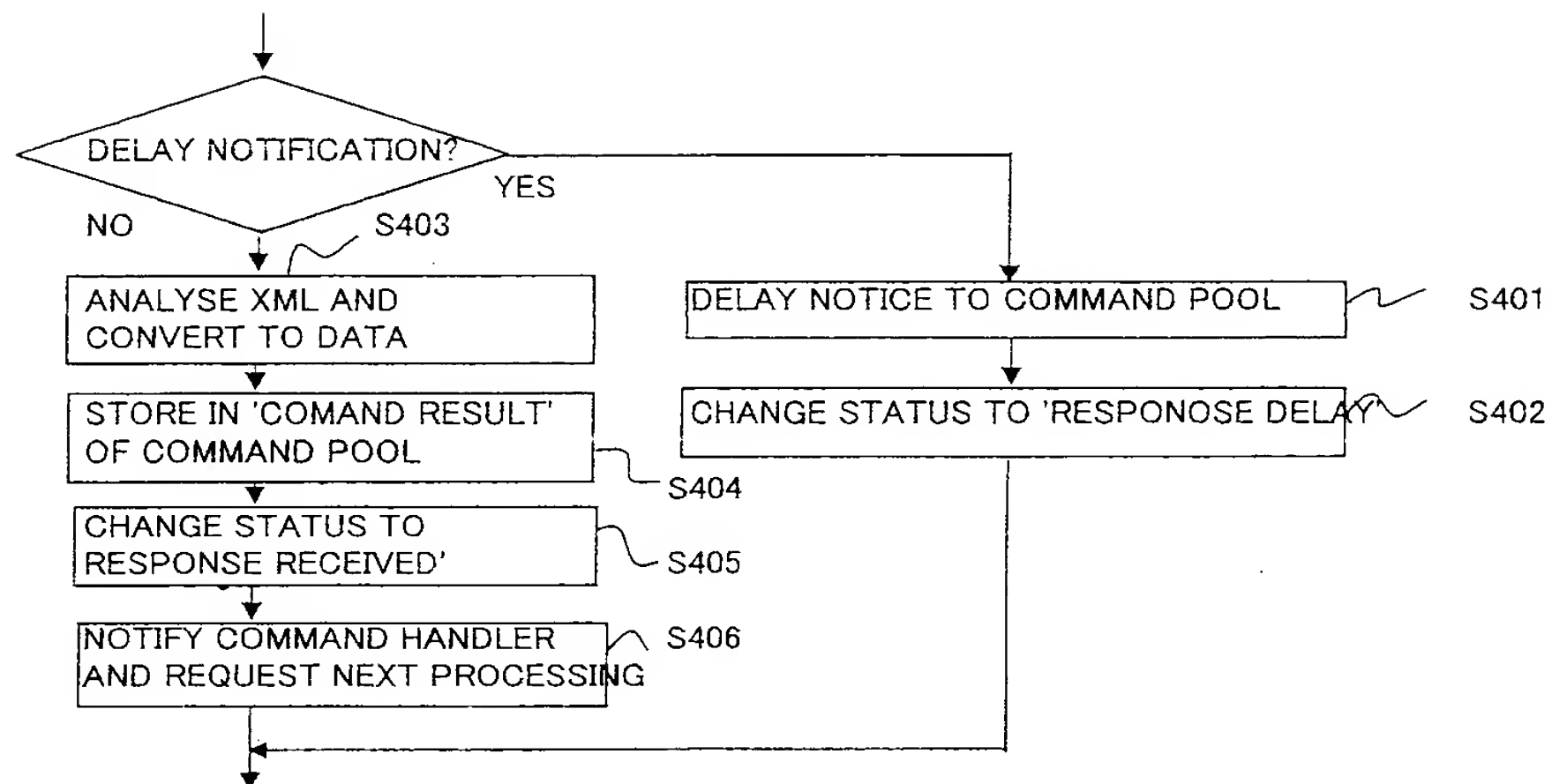
REQUEST SHEET	COMMAND SHEET
REQUEST ID	REQUEST ID
STATUS (INITIAL VALUE: NOT PROCESSED)	STATUS (INITIAL VALUE: NOT TRANSMITTED)
SENDER IDENTIFICATION INFORMATION	DESTINATION IDENTIFICATION INFORMATION
METHOD NAME (e.g. TROUBLE NOTIFICATION)	METHOD NAME (e.g. COUNTER ACQUISITION)
INPUT PARAMETER (e.g. TROUBLE CONTENT)	INPUT PARAMETER
OUTPUT PARAMETER	COMMAND RESULT
(BLANK UNTIL PROCESS IS COMPLETED)	(BLANK UNTIL ACQUIRING RESPONSE)
REQUEST HANDLER	COMMAND RESULT HANDLER

(A) (B)

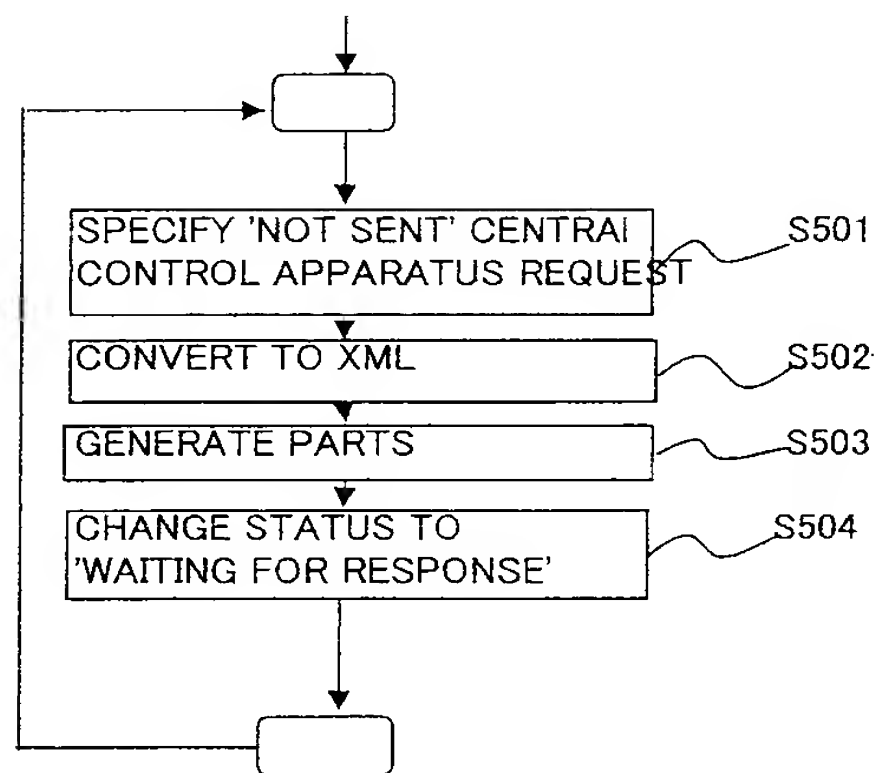
[Fig. 11]



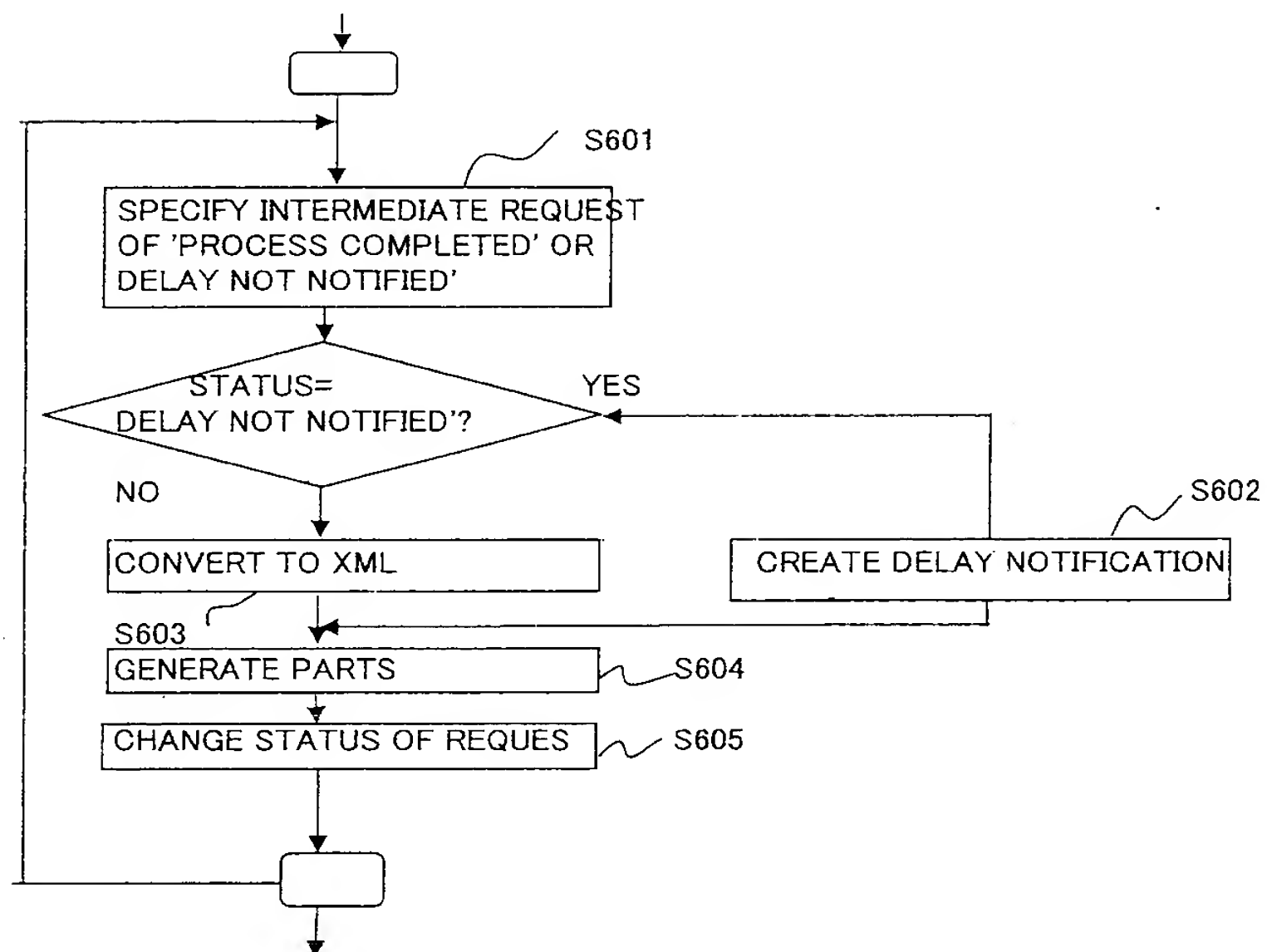
[Fig. 12]



[Fig. 13]



[Fig. 14]



[Fig. 15]

Content-Type: text/xml; charset=UTF-8
Content-Transfer-Encoding: 8bit

```
< s:Envelope
  xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:se="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:n="http://www.xxxxxx"
  xmlns:ns="http://www.yyyyyy"
  s:encodingStyle="http://schemas.xmlsoap.org/soap/">

  < s:Header >
    < n: REQUEST >
      < REQUEST ID > 10000000 < / REQUEST ID >
      < SENDER >
        < INTERMEDIATE DEVICE ID > ABCABC < / INTERMEDIATE DEVICE ID >
      < /DESTINATION >
        < IMAGE FORMING APPARATUS ID >XYZXYZ < / IMAGE FORMING APPARATUS ID >
      < / DESTINATION >
    < /n: REQUEST >
  </s:Header>

  < s:Body >
    <-- RENPONSE CONTENT SUCH AS METHOD NAME, ARGUMENT-->
  < /s:Body >

< /s:Envelope >
```

[Fig. 16]

Content-Type: text/xml; charset=UTF-8
Content-Transfer-Encoding: 8bit

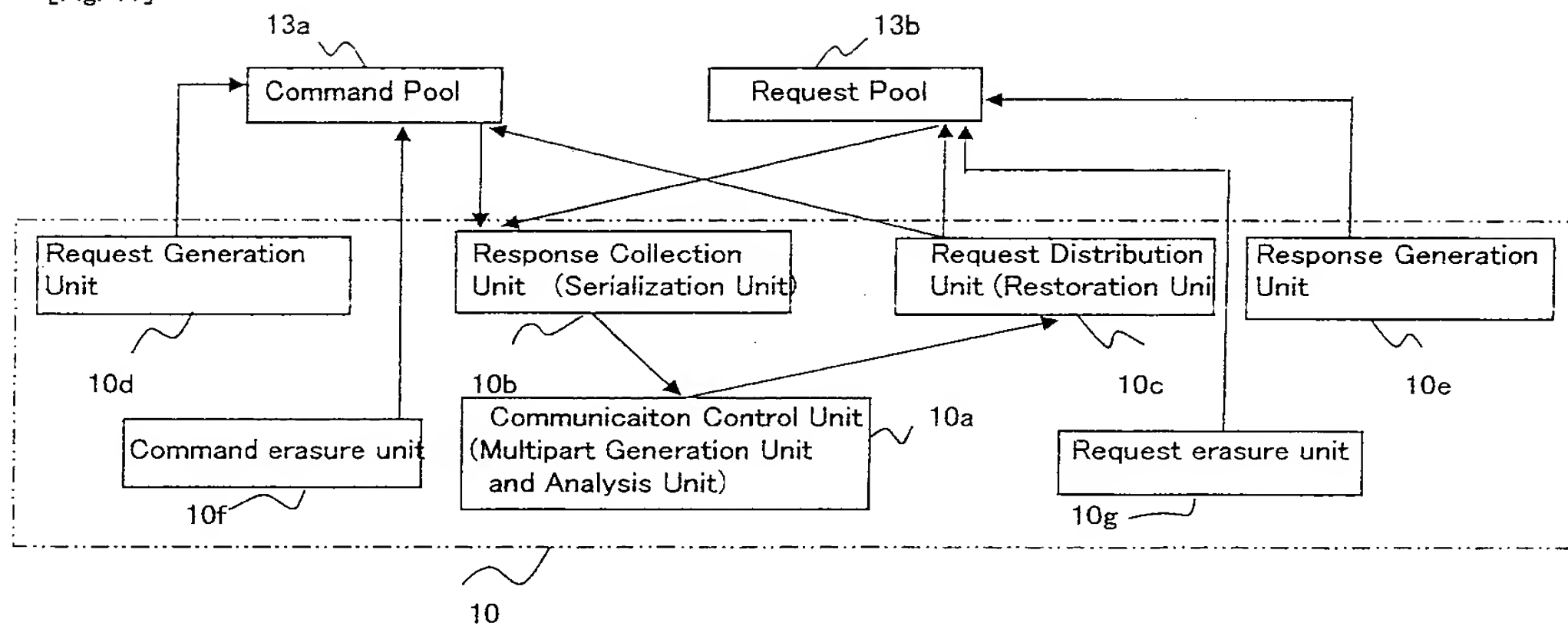
```
< s:Envelope
  xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:se="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:n="http://www.xxxxxx"
  xmlns:ns="http://www.yyyyyy"
  s:encodingStyle="http://schemas.xmlsoap.org/soap/">

  < s:Header >
    < n: RESPONSE >
      < REQUEST ID > 10000000 < / REQUEST ID >
      < SENDER >
        < INTERMEDIATE DEVICE ID > ABCABC < / INTERMEDIATE DEVICE ID >
      < / DESTINATION >
      < STATUS > OK or Delay </STATUS>
    </n:RESPONSE>
  < /s:Header >

  < s:Body >
    <-- RENPONSE CONTENT SUCH AS RETURN VALUE-->
  < /s:Body >

< /s:Envelope >
```

[Fig. 17]



[Fig. 18]

Content-Type: text/xml; charset=UTF-8

Content-Transfer-Encoding: 8bit

```
< s:Envelope
  xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:se="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:n="http://www.xxxxxx"
  xmlns:ns="http://www.yyyyyy"
  s:encodingStyle="http://schemas.xmlsoap.org/soap/">

  < s:Header >
    < n: REQUEST >
      < REQUEST ID > 10000000 < / REQUEST ID >
      < DESTINATION >
        < INTERMEDIATE DEVICE ID > ALL < / INTERMEDIATE DEVICE ID >
      < /DESTINATION >
      <DESTINATION>
        < IMAGE FORMING APPARATUS ID >NONE < / IMAGE FORMING APPARATUS ID >
      < / DESTINATION >
    < /n: REQUEST >
  </s:Header>

  < s:Body >
    <-- REQUEST CONTENT SUCH AS METHOD NAME, ARGUMENT-->
  < /s:Body >

< /s:Envelope >
```

[Fig. 19]

Content-Type: text/xml; charset=UTF-8

Content-Transfer-Encoding: 8bit

```
< s:Envelope
  xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:se="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:n="http://www.xxxxxx"
  xmlns:ns="http://www.yyyyyy"
  s:encodingStyle="http://schemas.xmlsoap.org/soap/">

  < s:Header >
    < n: REQUEST >
      < REQUEST ID > 10000000 < / REQUEST ID >
      < DESTINATION >
        < INTERMEDIATE DEVICE ID > ABCABC < / INTERMEDIATE DEVICE ID >
      < /DESTINATION >
      <DESTINATION>
        < IMAGE FORMING APPARATUS ID >ALL < / IMAGE FORMING APPARATUS ID >
      < / DESTINATION >
    < /n: REQUEST >
  </s:Header>

  < s:Body >
    <-- REQUEST CONTENT SUCH AS METHOD NAME, ARGUMENT-->
  < /s:Body >

< /s:Envelope >
```


[Fig. 20]

Content-Type: text/xml; charset=UTF-8

Content-Transfer-Encoding: 8bit

```
< s:Envelope
  xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:se="http://schemas.xmlsoap.org/soap/encoding/"
  xmlns:n="http://www.xxxxxx"
  xmlns:ns="http://www.yyyyyy"
  s:encodingStyle="http://schemas.xmlsoap.org/soap/">

  < s:Header >
    < n: REQUEST >
      < REQUEST ID > 10000000 < / REQUEST ID >
      < DESTINATION >
        < INTERMEDIATE DEVICE ID > ALL < / INTERMEDIATE DEVICE ID >
      < /DESTINATION >
      <DESTINATION>
        < IMAGE FORMING APPARATUS ID >ALL < / IMAGE FORMING APPARATUS ID >
      < / DESTINATION >
    < /n: REQUEST >
  </s:Header>

  < s:Body >
    <-- REQUEST CONTENT SUCH AS METHOD NAME, ARGUMENT-->
  < /s:Body >

< /s:Envelope >
```